

NOTICES *

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A polyoxaylene series polymer (A) which has a silicon containing functional group which can construct a bridge by forming a siloxane bond.

An amine compound — and an allene condensation catalyst than are cationic acid tin salt (1) and a non-tin catalyst (E).

It is a hardener constituent to contain Silicate (B) in tetra alkoxoalane or its partial hydrolysis condensate.

A carbon atom in which carboxylic acid tin (C) attains a carbonyl group is the carboxylic acid carbon which is the 4th class carbon

A carbon atom in which a non-tin catalyst (E) adjoins a carbonyl group is carboxylic acid which is 4th class carbon.

A hardenability constituent
[Claim 2]

A polyoxyalkylene series polymer in which a polyoxyalkylene series polymer (A) which has a silicono containing functional group which can construct a bridge by forming a siloxane bond introduced an

unsaturation group into an end, and a general formula (1) :

an alkyl group of the carbon numbers 1-20 from which R¹ in a formula and R² were the same as in

different. When the Tori ORGANO siloxy group shown by any group of the carbon numbers 6-20, alkyl group of the carbon numbers 7-20, or (R')₂SiO- is shown and R¹ or two or more R² exist,

they may be the same and may differ. R' is a hydrocarbon group of monovalence of the carbon

hydrolytic basis, and when two or more X exists, they may be the same and may differ. As for a, C

about b in m bases ($S \setminus \{2-b, b\}$), they may be the same if b shows 0, 1, or 2, respectively. About b in m bases ($S \setminus \{2-b, b\}$), they may be the same if m shows an integer of 0 to 19, however — what satisfies $a+b \equiv 1 \pmod{m}$ may differ. m shows an integer of 0 to 19, however — what satisfies $a+b \equiv 1 \pmod{m}$ may differ.

the hardenability constituent according to claim 1 being a polyoxyalkylene series polymer obtained by an addition reaction with a hydrosilane compound expressed.

[Claim 3] The hardenable constituent according to claim 1 or 2 in which a polyoxyalkylene series polymer

which has a silicon containing functional group which can construct a bridge by forming a siloxane bond is characterized by being a polymer which does not contain an amide segment (-NH-CO-)

[Claim 4] substantially in a principal chain skeleton.

An object for interior panels containing a hardenable constituent of a description in any one of Claims 1-3, an object for face panels, or adhesives for car panels.

[Claim 5] A sealing material for working joint

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of invention]
This invention relates to the hardenability constituent containing the organic polymer which has a silicon containing functional group (hereinafter, a reactive silicon group) which can construct a bridge by forming a siloxane bond.

[0002]

[Description of the Prior Art]
It is known that the organic polymer which contains at least one reactive silicon group in a molecule has the interesting character in which construct a bridge by formation of the siloxane bond accompanied by the hydrolysis reaction of a reactive silicon group, etc., and a rubber-like hardened material is obtained with hygroscopic surface moisture etc. also in a room temperature.

[0003]
In the polymer which has these reactive silicon groups, a polyacrylate series polymer and a polyisobutylene system polymer are already produced industrially, and are widely used for uses, such as a sealing material, adhesives, and a paint.

[0004]

The adhesives for interior panels, the adhesives for face panels, the adhesives for tiling, the adhesives for stone tiling, When the resin for adhesives used for the adhesives for finishing of wall, the adhesives for car panels, etc. is inferior to stability or creep resistance, an adhesive layer may pass with prudence and the stress from the outside of adhesives and it may change by the time, and a panel like, a stone, etc. may shift. Also in ceiling finishing adhesives or floor finishing adhesives, if inferior to stability or creep resistance, an adhesive layer may pass and it may change by the time, and unevenness of a ceiling surface or a floor in time arise. If the stability of the electrical and electric equipment, an electron, and the adhesives for nonsignal-mechanical-equipment assemblies and creep resistance are bad, an adhesive layer may pass, and it may change by the time, and may be connected with the degradation of apparatus. Therefore, it is called for that the constituent for these adhesives is excellent in stability or creep resistance.

[0005]
A sealing material generally fills up the joined part and crevices between various members, and he is used in order to give water-tight and airtightness. Therefore, since the flattary nature to the use part over a long period of time is very important, excelling in stability or endurance is called for as physical properties of a hardened material. Working point of a building with an especially large change of joint width (Kasa), the circumference of glass, the circumference of a window frame and a curtain wall, and various face panels — business — stability and endurance excellent in the constituent used for a sealing material, the sealing material for direct grazing, the sealing material for multiple glass, the sealing material for speed signal generator construction methods, etc. are called for.

[0006]
On the other hand, (the patent documents 1), (the patent documents 5), the (patent documents 6), the (patent documents 7), the (patent documents 8), (the patent documents 9), the (patent documents 10), the (patent documents 11), the (patent documents 12), (the patent documents 13), the (patent documents 14), the (patent documents 15), the (patent documents 16), (the patent documents 17), (the patent documents 18), the (patent documents 19), the (patent documents 20), the (patent documents 21), the (patent documents 22), the (patent documents 23), the (patent documents 24), the (patent documents 25), the (patent documents 26), the (patent documents 27), the (patent documents 28), and the (patent documents 29). Although the room-temperature-curing nature group which uses as an essential ingredient the organic polymer which has the reactive silicon group which three hydroxyl bases combined on silicon is indicated, in these advanced technology, the fact, curability based on the reactive silicon group which three hydroxyl bases combined is mainly indicated, and the description which suggests stability, creep resistance, and endurance is not indicated.

[0007]
[Patent documents 1] JP-H10-245482,A
[0008]
[Patent documents 2] JP-H10-245484,A
[0009]
[Patent documents 3] JP-H10-251552,A
[0010]
[Patent documents 4] JP-H10-324793,A
[0011]
[Patent documents 5] JP-H10-325030,A
[0012]
[Patent documents 6] JP-H11-12473,A
[0013]
[Patent documents 7] JP-H11-12480,A
[0014]
[Patent documents 8] JP-H11-21463,A
[0015]
[Patent documents 9] JP-H11-29713,A
[0016]
[Patent documents 10] JP-H11-49869,A
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[Patent documents 11] JP-H11-4970,A
[0018]
[Patent documents 12] JP-H11-16831,A
[0019]
[Patent documents 13] JP-H11-124509,A
[0020]
[Patent documents 14] WO No. 47939 L 98 to
[0021]
[Patent documents 15] JP-2000-34391,A
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[Patent documents 16]

JP 2000-19676.A

[Patent documents 17]

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[Patent documents 18]

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[Patent documents 19]

JP 2000-129146.A

[Patent documents 20]

JP 2000-129145.A

[Patent documents 21]

JP 2000-129144.A

[Patent documents 22]

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[Patent documents 23]

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[Patent documents 24]

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[Patent documents 25]

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[Patent documents 26]

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[Patent documents 28]

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[Patent documents 29]

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[Patent documents 30]

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[Patent documents 31]

JP 2001-357773.A

[Patent documents 32]

JP 2001-357774.A

[Patent documents 33]

JP 2001-357775.A

[Patent documents 34]

JP 2001-357776.A

[Patent documents 35]

JP 2001-357777.A

[Patent documents 36]

JP 2001-357778.A

[Problem(s) to be Solved by the Invention]

An object & view of the above-mentioned actual condition of this invention is to provide the stability, endurance, and creep resistance corrective strategy of a hardened material. The adhesives for interior panels with which stability, endurance, and creep resistance have been improved as for this invention. The adhesives for tiling, the adhesives for stone, tensions, ceiling finishing adhesives, floor-finishing adhesives, the adhesives for finishing of wall, the adhesives for car panels, the electrical and electric equipment, an electron and the adhesives for precision-mechanical equipment assemblies. It aims at providing the sealing material for direct grating, the sealing material for multiple gases, the sealing material for speed signal generator construction methods or the sealing material for working joint of a building. An object of this invention is to provide the hardenable constituent, which can give the hardened material excellent in stability, endurance, and creep resistance.

[0037]

[Means for Solving the Problem]
By using on silicon a silicon containing functional group which has three or more hydroxyl bases as a reactive silicon group of this polymer, as a result of inquiring whochareldy, in order that this invention persons may solve such a problem, it found out improving stability, endurance, and creep resistance, and this invention was completed.

[0038] That is, the 1st is related with stability, endurance, and creep resistance corrective strategy of a hardened material using an organic polymer (A) which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention, and a hardenable constituent containing silicate (B).

[0039] The 2nd is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention. A silicon containing functional group which can construct a bridge by forming a siloxane bond. It is related with stability, endurance, and creep resistance corrective strategy of a hardened material using on silicon a hardenable constituent containing an organic polymer (A1) which is a silicon containing functional group which has three or more hydroxyl bases.

[0040] A main chain of an organic polymer (A1) which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment. It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in the above using a hardenable system copolymer manufactured by a living radical-polymerization method (meta).

[0041] It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenable constituent which contains silicate (B) further as a desirable embodiment.

[0042] It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenable constituent which contains an organo tin catalyst (C) further as a desirable embodiment.

[0043] It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenable constituent which is a hardenable material containing an organic polymer (A2) which averages per molecule a siloxane bond, and has 1.7~5 pieces.

[0044] The 3rd is an organic polymer which can construct a bridge by forming a siloxane bond as a bridge connecting functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment. It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in the above using on silicon a hardenable constituent, which is a siloxane containing functional group which has three or more hydroxyl bases.

[0045] An organic polymer in which an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment introduced an unsaturation group into a direct group, and general formula (1):

$$\text{H-SiR}_2=\text{X}_1=\text{SiR}_2=\text{X}_2=\text{O}$$

an alkyl group of carbon numbers 1~20 from which R₁ formula and R₂ were the same as or different. When the ion ORGANOGO siloxane group shown by a ring formula (2) or (R)₃ SiO₃ is shown and R₁ or two or more R₁² exist, an alkyl group of carbon numbers 7~20, or (R)₃ SiO₃ is shown and R₁ or two or more R₁² exist.

[0046] https://www4.ipdl.inpt.go.jp/cgi-bin/tran_web.cgi?e=jaw_2aw_uhttp://www4.ipdl... 2010/04/30
 https://www4.ipdl.inpt.go.jp/cgi-bin/tran_web.cgi?e=jaw_2aw_uhttp://www4.ipdl... 2010/04/30

they may be the same and may differ. R' is a hydrocarbon group of monocyclofuran of the carbon numbers 1-20 here, and thus R' may be the same and may differ. X shows a hydroxyl group or a hydroxide base, and when two or more X exists, they may be the same and may differ. As for a, 0, 1, 2, or 3b shows 0, 1, or 2, respectively. About b in m based $(SiR_1^2)_2X_1^2O_1$, they may be the same and may differ. m shows an integer of 0 to 13, however, — what satisfies α - α (α - α) $b=1$ — carrying out — it is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenability constituent which is an organic polymer obtained by an addition reaction with a hydroxane compound expressed.

[0047] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment introduced an unsaturation group into an end, and general formula (2) :



X, in a formula shows a hydroxyl group or a hydroxide basis, and three X may be the same and it may differ. It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenability constituent which is an organic polymer obtained by an addition reaction with a hydroxane compound expressed.

[0048] The 4th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention, and thus organic polymer is a general formula (3) :



(R'' formula a divalent organic group of the carbon numbers 1-20 which contain one or more sorts chosen from a group which consists of hydrogen, oxygen, and nitrogen as a composition atom) [show and] R', R'', X, a, b, and m — the above — it is the same — it is related with stability, endurance, and creep resistance corrective strategy of a hardened material using a hardenability constituent which is an organic polymer (A3) which has a structure part with which it is expressed.

[0049] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment is a general formula (4) :



An organic polymer which introduced an unsaturation group expressed with (R'' is the same as the above), and general formula (1) :



(R'' formula and X are the same as the above) — it is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenability constituent which is an organic polymer which has a structure part with which it is expressed.

[0051] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment. It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using for a principal chain skeleton a hardenability constituent which is an organic polymer which does not contain an amide segment (-NH-CO-) substantially.

[0052]

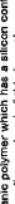
they may be the same and may differ. R' is a hydrocarbon group of monocyclofuran of the carbon numbers 1-20 here, and thus R' may be the same and may differ. X shows a hydroxyl group or a hydroxide base, and when two or more X exists, they may be the same and may differ. As for a, 0, 1, 2, or 3b shows 0, 1, or 2, respectively. About b in m based $(SiR_1^2)_2X_1^2O_1$, they may be the same and may differ. m shows an integer of 0 to 13, however, — what satisfies α - α (α - α) $b=1$ — carrying out — it is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenability constituent which is an organic polymer obtained by an addition reaction with a hydroxane compound expressed.

[0047] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment introduced an unsaturation group into an end, and general formula (2) :



X, in a formula shows a hydroxyl group or a hydroxide basis, and three X may be the same and it may differ. It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenability constituent which is an organic polymer obtained by an addition reaction with a hydroxane compound expressed.

[0048] The 4th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention, and thus organic polymer is a general formula (3) :



(R'' formula a divalent organic group of the carbon numbers 1-20 which contain one or more sorts chosen from a group which consists of hydrogen, oxygen, and nitrogen as a composition atom) [show and] R', R'', X, a, b, and m — the above — it is the same — it is related with stability, endurance, and creep resistance corrective strategy of a hardened material using a hardenability constituent which is an organic polymer (A3) which has a structure part with which it is expressed.

[0049] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment is a general formula (4) :



An organic polymer which introduced an unsaturation group expressed with (R'' is the same as the above), and general formula (1) :



(R'' formula and X are the same as the above) — it is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenability constituent which is an organic polymer which has a structure part with which it is expressed.

[0051] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment. It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using for a principal chain skeleton a hardenability constituent which is an organic polymer which does not contain an amide segment (-NH-CO-) substantially.

[0052]

A silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment is a general formula (6) :



(three R' is an organic group of monovalence of the carbon numbers 2-20 independently among a formula, respectively) — it is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either using a hardenability constituent which is a basis expressed.

[0053] It is related with stability, endurance, and creep resistance corrective strategy of a hardened material given in said either wherein a silicon containing functional group which can construct a bridge by forming a siloxane bond uses a hardenability constituent which is a triethoxy silyl group as a desirable embodiment.

[0054]

The 5th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention. A silicon containing functional group which can construct a bridge by forming a siloxane bond is related with thin layer hardenability corrective strategy using on silicon an organic polymer (A1) which is a silicon containing functional group which has three or more hydroxyl bases, and a hardenability constituent containing an organic tin catalyst (D).

[0055]

An organic polymer (A) which has a silicon containing functional group which can construct a bridge when the 6th form a siloxane bond of this invention. And adhesives for interior panels containing siloxane (B), adhesives for face panels, adhesives for stone tention, ceiling finishing adhesives; it is related with floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, adhesives for direct grating, an electron and adhesives for precision mechanical-equipment assemblies, a sealing material for direct grating, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working point of a building.

[0056]

The 7th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention. A silicon containing functional group which can construct a bridge by forming a siloxane bond. It is characterized by containing an organic polymer (A1) which is a silicon containing functional group which has three or more hydroxyl bases on silicon. Adhesives for interior panels, adhesives for face panels, adhesives for stone tention, ceiling finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grating, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working point of a building.

[0057]

A main chain of an organic polymer (A1) which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment. Using a hardenability constituent which is an acrylic ester system copolymer manufactured by a living radical-polymerization method (mtc) to the above by which it is characterized A description. Adhesives for interior panels, adhesives for face panels, adhesives for stone tention, ceiling finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grating, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0058]

As a desirable embodiment, containing silicate (B) further to said either by which it is characterized A description. Adhesives for interior panels, adhesives for face panels, adhesives for filling adhesives for stone tention, ceiling finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for car panels, it is related with the electrical and electric equipment, an electron and

adhesive material for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0059] As a desirable embodiment, containing carboxylic-acid tin salt (C) further to said either by which it is characterized A description. Adhesives for interior panels, adhesives for tiling, adhesives for stone tenses. Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0060] As a desirable embodiment, containing an organic tin catalyst (D) further to said either by which it is characterized A description. Adhesives for interior panels, adhesives for tiling, adhesives for stone tenses. Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for multiple glass, a sealing material for working joint of a building.

[0061] As a desirable embodiment, containing functional group, which can construct a bridge by forming a siloxane bond of this invention. This is characterized by which it is an organic polymer which has a silicon containing functional group, which can construct a bridge by forming a siloxane bond of this invention. It is characterized by this organic polymer being an organic polymer (A) which averages per molecule a silicon containing functional group which can construct a bridge by forming a siloxane bond, and has 1,1-2 pieces. Adhesives for interior panels, adhesives for face panels, adhesives for tiling, adhesives for stone tenses, Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0062] A silicon containing functional group which can construct a bridge by forming siloxane bond as a desirability embodiment. That is, it is a silicon containing functional group which has three or more hydroxyl bases on silicon to the above by which it is characterized A description. Adhesives for interior panels, adhesives for face panels, adhesives for tiling, adhesives for stone tenses, Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0063] An organic polymer in which an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment introduced an unsaturation group into an end and a general formula (1) :



That is an organic polymer obtained by an addition reaction with a hydrosilane compound expressed with (R¹ to 4 formula, R², X₁, a, b, and m are the same as the above) to said either by which it is characterized A description. Adhesives for interior panels, adhesives for tiling, adhesives for stone tenses. Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0064] An organic polymer in which an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment. That is, it is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment.

[0065] An organic polymer in which an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment. That is, it is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment.

can construct a bridge by forming a siloxane bond as a desirable embodiment introduced an unsaturation group into an end and a general formula (2) :

That is an organic polymer obtained by an addition reaction with a hydrosilane compound expressed with (X₁ to 4 formula is the same as the above) to said either by which it is characterized A description. Adhesives for interior panels, adhesives for tiling, adhesives for stone tenses. Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0066] The 9th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention, and this organic polymer is a general formula (3) :

. It is characterized by being an organic polymer (A3) which has a structure part expressed with (R¹ to 4 formula, R², X₁, a, b, and m are the same as the above). Adhesives for interior panels, adhesives for face panels, adhesives for tiling, adhesives for stone tenses. Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for multiple glass, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0067] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment is a general formula (4) :

An organic polymer which introduced an unsaturation group expressed with (R¹ is the same as the above) and general formula (1) :

That is an organic polymer obtained by an addition reaction with a hydrosilane compound expressed with (R¹ to 4 formula, R², X₁, a, b, and m are the same as the above) to the above by which it is characterized A description. Adhesives for interior panels, adhesives for face panels, adhesives for face panels, adhesives for tiling, adhesives for stone tenses. Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0068] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment is a general formula (5) :

(R¹ formula, and X are the same as the above,)—a description to said either being an organic polymer which has a structure part with which it is expressed adhesives for interior panels, adhesives for face panels, adhesives for tiling, adhesives for stone tenses. Ceiling, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical-equipment assemblies, a sealing material for direct grazing, a sealing material for speed signal generator construction methods, or a sealing material for working joint of a building.

[0069] An organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment.

[0070] An organic polymer in which an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment which forms a siloxane bond of this invention, web.ce6je2auw.j=htps://k3A2Fwww4.pdf... 2010/04/30 https://www4.ipmipr.go.jp/cgi-bin/tran.web.ce6je2auw.j=htps://k3A2Fwww4.pdf... 2010/04/30

contain an amide segment (-(NH-OCO)-) substantially in a principal chain skeleton to said either by which it is characterized A desorption Adhesives for interior panels, adhesives for face panels, adhesives for tinting, adhesives for stone tapers, ceiling finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is related with the electrical and electric equipment, an electron and adhesives for precision-mechanical equipment assemblies, a sealing material for direct glazing, a sealing material for multiple glass, a sealing material for speed signal paneling for construction methods, or a sealing material for window joint of a building.

(6) — SKORF[®] [0069] A silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment is a general formula (6) :

$$\text{—(SKORF)}^n \quad (6)$$

(7) — A description to said either being a basis expressed, Adhesives for interior panels, adhesives for tinting, adhesives for floor, adhesives for ceiling, adhesives for finishing of wall, adhesives for tinting, adhesives for finishing of wall, adhesives for precision-mechanical equipment, an electron and electric equipment, a sealing material for direct glazing, a



[010] A silicon containing functional group which can construct a bridge by forming a siloxane bond as a sealing material for multiple glass, a sealing material for speed signal generator construction institutions or a sealing material for working joint of a building.

The 10th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention. A silicon containing functional group which can or is a sealing material for working joint of a building [0071]

construct, a bridge by forming a siloxane bond is related with an organic polymer (A1) which is a

[0072] As a desirable embodiment, silicata is related with a hardenability constituent given in the above silicon containing functional group which has three or more hydroxylic bases on silicon, and a hardenability constituent containing silicate (B).

The 11th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention. A silicon containing functional group which can construct a bridge by forming a siloxane bond. It is related with an organic polymer(A1) which is being a monomers or two binary species.

In [70,71] a carboxyl group is the 4th class carbon.

The 12th is an organic polymer which has a silicon containing functional group which can conduct a bridge by forming a siloxane bond of this invention. A silicon containing functional group which can construct a bridge by forming a siloxane bond is related with an organic polymer (A) and carboxylic acid tin salt (C), which are the silicon containing functional groups which have three or more

The 15th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this bond. A silicon containing functional group which can construct a bridge by forming a siloxane bond is related with an organic polymer (A1) which is a hydroxyl bases on silicon, and a hardness/mobility constraint containing an organic tri-oxayl (UV).

A silicon containing functional group which has three or more hydrolytic bases on silicon, and a hardening constituent containing a non-*tin* catalyst (E).

[0076] The 14th is an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention. A silicon containing functional group which can construct a bridge by forming a siloxane bond is related with an organic polymer (A1) which is a silicon containing functional group which has a three or more hydroxyl bases on silicon, and a hardening constituent containing a minute hollow body (F).
[0077]

An organic polymer in which an organic polymer which has a silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment introduced an unsaturation group into an end, and general formula (2) :

It is related with a hardenability constituent given in said either being an organic polymer obtained by an addition reaction with a hydrosilane compound expressed with X in a formula is the same as the above.

- A silicon containing functional group which can construct a bridge by forming a siloxane bond as a desirable embodiment is a general formula (6) :

A silicon containing functional group which can construct a bridge by forming a siloxane bond of this invention, formula is the same as the above.

and can construct a bridge by forming a siloxane bond is a general formula (6) :
 $-Si(O\cdot)^3(6)$

(e) R⁵ is an organic group of monocovalence of the carbon numbers 1–20 independently among a molecule, respectively, and c shows 0, 1, or 2, respectively. It is related with a hardenability constituent in independently, and c shows 0, 1, or 2, respectively.

A silicon containing functional group which the 17th is an organic polymer which has a silicon containing functional group which can construct a hybrid by forming a siloxane bond of this invention.

An organic polymer (A4) which has a basis expressed with (R^m)ⁿ formula is the same as the above), and can construct a bridge by forming a siloxane bond is a general formula (6);

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5295224/> 2010/04/30

IP.4101632.B [DETAILED DESCRIPTION]

[00086] there are many amide segments (--NH--CO--) generated in a principal chain skeleton based on said amide segments, and viscosity of an organic polymer will become high and will serve as a bad control of the viscosity. Therefore, as for quantity of an amide segment occupied in a principal chain skeleton of an organic polymer, it is preferred that 3 or less % of the weight, it is more preferred that it is 1 or less % of the weight, and it is most preferred that an amide segment is not included substantially.

[00087] a reactive silicon group contained in an organic polymer which has a reactive silicon group is a basis which can construct a bridge by forming a siloxane bond with the reaction which is accelerated by a silanol condensation



Organic numbers —20 from which R₁ formula and R₂² were the same as or different. When the Ten ORGANIC siloxane group shown by ayl group of the carbon numbers —20, an alkyl group of the carbon numbers —20, or (R₁)₂SiO₃— is shown, R₁ or two or more R₂ exist. R₁ is a hydrocarbon group of monovalence of the carbon number may be the same and may differ. R₂ is a hydrocarbon group or a hydroxyl group and when two or more R₂ exists, they may be the same and may differ. As for a, 0, 1, 2, or 3, the hydroxyl groups, and when two or more R₂ exists, they may be the same and may differ. About 2 in bases (SR₁)₂X₂O, they may be a, 0, 1, 2, or 3, respectively. About 2 in m shows m, where m is an integer of 0 to 19, however — what satisfies a+sigma b=1 — carrying out —

([000989](#)). A hydroxylic basis and a hydroxyl group can be combined with one silicon atom in the 1-3 ranges, and an alkoxyl group, an amino group, a sulfonyl group, and an acetoxy group are preferred.

In particular, it is a general formula (12):

$$X_1 = \text{SiR}_2\text{X}_2$$
 (where R and X are the same as the above atoms or formulae.) Since a reactive silicon group expressed with

An integer of 1-3 is easy to receive, a's is preferred.
 [0101] As an example, of R^1 in the above-mentioned general formulae [11] and [12], and R^2 . For example, as a methyl group, such as an aryl group, such as cyclohexyl group, such as alyl groups, such as a methyl group, such as an ethyl group, and a cyclohexyl group, and an ethyl group, and an ethyl group, etc. ORGANO group R^1 is indicated to be 3° -which is a methyl group, a phenyl group, etc. (R₁), etc. are indicated. Especially in this case, a methyl group is preferred.

[0102]

bases combined on silicon in an organic polymer [A1].

Silicon, and constructed the bridge by a silicon Good stability is shown and remarkable creep is shown as compared with a case of reactive silicon.

[0105] (A1) As for the number of a+bcm of a general fuses hydrotalcites.

The Tori alkoxyl silyl groups has the good availability. The alkoxyl group of the carbon numbers 1-20 is preferred, and its thing of the carbon numbers 1-10 is trinethoxysilyl group and a triethoxy silyl group.

[0106] Generally, if weight % of reactive allilicon group constituent becomes low, it is known that the late when a carbon number is larger than 20.

**** However, if an ingredient (A1) of this invention is a polyimide, high endurance is maintainable even if it contains organic polymer in a hardenability control amount of 15 to 24 % of the weight especially preferable.

[0107] Especially in this invention, an organic polymer constituent is compatible in low cost and high to 26% of the weight.

numbers 2-20 can be used as a (A4) ingredient general formula (6) :
 $Six(OR^4)_3$ (6)

(three R^as is an organic group of monovalence δ—an organic polymer w/ formula, respectively.) — an organic polymer w/ ingredient.

It is known that methanol generated in connection with the use of methyl cellulose has peculiar toxicity of causing an obstacle of the number of an alkoxy group which combines the high methanol is not contained in alcohol gelling.

[0109] (A4) It is preferred that it is especially 2-4, and reactive silicon group, but serves as a constitutive element.

R⁴ of a general formula (6) of an ingredient, it Specifically, a triethoxy silyl group is the most while the hardenability of a hardenable composition may be largely stimulated of alcohol to generate may be large.

[0110] Especially in this invention, a principal chain is polyoxyalkylene in an organic polymer of the (

http://www4.ipdl.inpit.gov/p/cgi-bin/tran_web.cgi?eje?atw_u=http%3A%2F%2Fwww4.ipdl... 2010/04/30

http://www4.ipd.mpit.go.jp/ogi-bin/tran_web.cgi?jje?atw_u=http%3A%2F%2Fwww4.ipd... 2010/04/30

- SiOR⁴₃

A polyoxazoline series polymer which has a basis expressed with (R⁴)n formula is the same as the above) can be used as a (A5) ingredient.

[0111] 1-5 reactive silicon groups of an organic polymer (A) exist, preferably [that average per molecule and at least one piece exists, and more preferably, if the number of reactive silicon groups contained in one molecule of organic polymers (A) will be less than one piece, hardenability will become insufficient and become difficult to reveal a good rubber elasticity action. A reactive silicon group may exist in an end of an organo polymer (A) chain, and may exist in an inside. Since effective network chain density of an organic polymer (A) ingredient contained in a hardened material formed eventually will increase if a reactive silicon group exists in an end of a chain, a rubber-like hardened material in which a low elastic modulus is shown becomes easy to be obtained by high intensity and high elongation.

[0112] Especially in this invention, an organic polymer the number of reactive silicon groups per molecule averages, and 1-7 pieces exist in an organic polymer of the (A) ingredient can be used as an ingredient (A2).

[0113] A hardened material which the number of reactive silicon groups per molecule averaged this (A2) ingredient by R, and 1-7 pieces existed, and constructed the bridge by a silanol condensation reaction of that reactive silicon group. Good stability is shown, the number of reactive silicon groups per molecule averages, and remarkable creep resistance and an endurance improvement effect are shown as compared with a case of less than 1.7 reactive polymers.

[0114] As for the number of reactive silicon groups per molecule of an ingredient, it is more preferred that they are 2-pieces, and it is preferred that they are especially 2-3 pieces. When there are few 1.7 reactive silicon groups per molecule, an improvement effect of the stability of a hardenability constituent of this invention, endurance, and creep resistance may not be enough, and when larger than five pieces, elongation of a hardened material obtained may become small.

[0115] Especially at this invention, it is a general formula of the (A) ingredient (3) :



(R² formula) a divalent organic group of the carbon numbers 1-20 which contain one or more sorts chosen from a group which consists of hydrogen, oxygen, and nitrogen as a composition part [] show and J R¹ R², X, a, b, and m — the above — is the same — an organic polymer which has a structure part with which it is expressed can be used as a (A3) ingredient.

[0116] A hardened material which this (A3) ingredient has a structure part expressed with a general formula (3), and constructed the bridge by a silanol condensation reaction of that reactive silicon group shows good stability, and shows remarkable creep resistance and an endurance improvement effect, as compared with a case of an organic polymer which has terminal structures other than a general formula (3).

[0117] As for a carbon number of R¹ of a general formula (3), it is more preferred from a point of availability that it is 1-10, and it is preferred that it is especially 1-4. Specifically, R³ has the most preferred methylene group.

[0118] An ingredient is a general formula (5) :



[0119] (A) what is necessary is just to perform introduction of a reactive silicon group of an ingredient by a publicly known method. That is, the following methods are mentioned, for example.

[020] (b) Make an organic compound which has an active group and an unsaturation group which show reactivity to an organic polymer which has functional groups, such as a hydroxyl group, in a molecule to this functional group content. An acrylic polymer containing an unsaturation group. Or an unsaturation group content. An acrylic polymer is obtained by copolymerization with an unsaturation group content epoxy compound. Subsequently, hydroxilane which has a reactive silicon group is made to act on an acquired compound. Subsequently, it hydroxylane.

[021] (c) Make a compound which has a sulphydryl group and a reactive silicon group react to an organic polymer containing an unsaturation group produced by making it to be the same as that of the (b) method.

[022] (d) Make a compound which has a functional group and a reactive silicon group which show reactivity to an organic polymer which has functional groups, such as a hydroxyl group, an epoxy group, and an isocyanate group, in a molecule to this functional group react.

[023] Since a high reactivity is obtained in comparatively short reaction time, a method of making a compound which has a polymer, an acetoxylic group, and a reactive silicon group which have a hydroxyl group react to an end of (b) or among (e)-(g) in the above method is preferred. An organic polymer which has the reactive silicon group obtained by a method of (b). (e)-(g) Since becoming a good hardenability constituent of workability rather than an organic polymer obtained by a method and an organic polymer obtained by a method of (e)-(g) has the strong bad smell based on an mercaptosilane, especially its method of (b) is preferred.

[024] (h) As an example of a hydroxylane compound used in a method. For example, triethoxilane, methyl/di chlorosilane, dimethylchlorosilane, Halogenation Slang, phenyl/dimethylsilane, Trimethoxysilane, Trehoxysilane, methyl/diisobutylsilane, Dimethyl Acetoxymethane. The hydroxilane like phenyl/dimethylsilane, methyl/diisobutylsilane, bis(dimethyl KETONSHI) methyl/methylsilane and bis(dimethyl KETOBASHI) methyl/methylsilane are raised. It is not limited to these. Especially among them, halogenation Slang and alkoxylane are preferred, especially alkoxylane has this quiet hydrolysis nature of a hardenability constituent obtained, and it is the most preferred to a handling and come sake.

[025] In the above-mentioned hydroxilane compound, it is a general formula (2) :

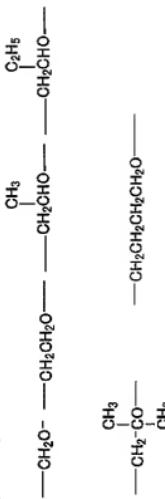
$$\text{H}-\text{SiR}_3^2 \quad (2)$$

[026] Since a hydroxilane compound expressed with (2) in a formula is the same as the above) has an especially large improvement effect of the stability of a hardenability constituent which consists of an organic polymer obtained by an addition reaction of this hydroxilane compound, endurance, and creep resistance, it is preferred. In a hydroxilane compound expressed with a general formula (2), trialkoxysilane, such as trimethoxysilane, triethoxysilane, and a tripropoxy silane, is more preferred.

[027] It is preferred to use trialkoxysilane which has an allyloxy group whose carbon number expressed with (R¹ formula) is the same as the above) two or more. A viewpoint of availability, safety on

[0142]
[Formula 2]

That whose principal chain skeleton is a saturated hydrocarbon system polymer has the feature which is excellent in heat resistance, weatherability, endurance, and humidity interception nature.



[01] A. *alkoxyalkylene* series polymer which has the above-mentioned reactive silicon group may be used with or without a low molecular weight distribution in the 1.6 or less amount of Polymer Division. It is not limited to in particular these.

Said saturated hydrocarbon system polymer is a polymer which does not contain substantially an aromatic carbon unsaturated bond other than an aromatic ring, and a polymer which makes the skeleton, (1), [which is an olefinic compound of the carbon numbers 1-6, such as ethylene, propylene, 1-butene, and isobutylene], is polymerized as a main monomer, and] (2) After making diene polymers, such as butadiene and isoprene, homopolymerize or copolymerize with one of the above-mentioned olefinic compound, can obtain by a method of hydrogenating, but, since an isobutylene system polymer and a hydrogenation polybutadiene system polymer tend to introduce a functional group into an end, and tend to control a molecular weight and can increase the number of and functional groups, they are preferred, and a composite ease to especially the isobutylene system polymer is preferred.

[0148]

That whose principal chain skeleton is a saturated hydrocarbon system polymer has the feature which is excellent in heat resistance, weatherability, endurance, and humidity interception nature.

[0149] All the monomeric units may be formed from an isobutylene unit, and an isobutylene system polymer.

Although a copolymer with other monomers may be sufficient what contains a repeating unit which originates in isobutylene in the field of rubber property 80% of weight, or more is preferred, what is contained 80% of a contained 80% of weight or more is more preferred, and especially a thing contained 90 to 99% of the weight is preferred.

[0150] AAs is a synthetic method of a saturated hydrocarbon system polymer, although various polymerization methods are reported conventionally, especially *living* polymerization which is called of recent years as polymerization is developed in higher polymerization [J. P. Kennedy et al.] which was found out by Kennedy and others in the case of a saturated hydrocarbon system polymer, especially an acrylonitrile-butadiene-styrene system polymer [J. Polymer Sci. and Polymer Chem., Vol. 25, p. 1997, 1987]. By using 15 volumes and 2643 pages, manufacturing easily is possible about 500 to 100,000 molecular weight can be obtained in 15 or less minutes. It is known that various functional groups can be introduced into molecular terminal.

[0111] As a process of a saturated hydrocarbon system polymer which has a reactive silicon group, For example, JP-04-108928B, JP-108928A, JP-265414A, although it writes in such Description of JP-04-229204A, JP-04-229205A, Patent Gazette No. 2538445, Patent Gazette No. 2538445, and JP-7-15152, it is not limited to in particular these.

(Especially (A7) a saturated hydrocarbon system polymer that has a basis expressed with (R₁M formula) is the same as the above) can be used as an ingredient. This (A7) ingredient has the feature which is excellent in heat resistance based on a saturated hydrocarbon system polymer, wearability, and methanol/methylbenzene interception nature of a principal chain skeleton, and does not have generation of methanol accompanying a hydrolysis reaction of a reactive silicon group, and is a polymer whose stability of a hardened material, endurance, and creep resistance is still better.

A saturated hydrocarbon system polymer which has the above-mentioned reactive silicon group may be used alone, and may be used together two or more sorts.

Especially in this invention, a chain can use what is an acrylo ester (meta) system copolymer as an ingredient (A6) in an organic polymer of the (A) ingredient.

Especially as an acrylo ester (meta) system monomer which constitutes a main chain of the aforementioned (meta) acrylic ester system polymer, it is not limited but various kinds of things can be used. If it illustrates, acrylic acid (meta), methyl acrylate (meta), (Meta) Ethyl acrylate, acrylic acid

(*meta*) Acrylic acid-*m*-butyl, isobutyl acrylate (*meta*).
 (*meta*) Acrylic acid-*t*-butyl, acrylic acid-*n*-pentyl, (*meta*) Acrylic acid-*n*-hexyl, acrylic acid-*n*-heptyl, acrylic acid-*n*-octyl, (*meta*) Acrylic acid-*n*-hexyl, acrylic acid-*n*-heptyl, acrylic acid-*n*-octyl, (*meta*) cyclohexyl, (*meta*) Acrylic acid-*t*-heptyl, acrylic acid-*t*-octyl.

(*tert*-butylmethoxyacetyl), gamma-(methylacetoxy)propanoic acid, an ethylenoate derivative of acrylic acid (Me₂Acyl), and trifluoromethylbenzoic acid, an acrylic acid (Me₂Acyl) 2-trifluoromethyl ester).

Acrylic acid series (meta) monomers, such as acrylic acid α -pernuro hexyl ester, acrylic acid (mata)

2-(*p*-fluorophenoxy)-, and acrylic acid (*m*eta)-2-(*p*-fluoro benzoyloxy), etc. are mentioned. In the aforementioned (meta) acrylic ester system copolymer, copolymerization of the following vinyl system monomer can also be carried out with an acrylic ester (*m*eta) system monomer. When this vinyl system monomer is illustrated styrene, vinyltoluene, allyl-methyl/styrene, Styrene system monomer, such as KURORU ethylene, styrene sulfonic acid, and its salts, Parluoro allylure, Fluoride content vinyl monomers, such as propylene propylene and vinylidene fluoride; Vinylchlorotetraoxide, Siloxane content vinyl system monomers, such as vinylchloroethylene and vinylidene fluoride; A maleic anhydride, Monoallyl ester and diallyl ester of maleic acid, Maleic acid, Monoallyl ester and diallyl ester of fumaric acid, Fumaric acid, Monoallyl ester and diallyl ester of itaconic acid, Itaconic acid, Maleimide, Maleimide, Propyl maleimide, butylmaleimide, Hexamethylene diisocyanate, diisocyanate, Alkylene diamine, Alkylenediamine, Alkylenediamine monomers, such as a methacrylamide, Acrylamide, Amino group content vinyl system monomers, such as a methacrylamide; Alkenes; butadiene, such as vinyl ester, ethylene, such as vinyl acetate, vinyl propionate, vinyl phthalate, benzoyl acid vinyl, and vinyl cinnamate acid and propylene. Conjugated dienes, such as isoprene; PVC/PVC, a vinyl chloride chloride, an allyl chloride, allyl alcohol, etc. are mentioned. These may be used independently, and even if it carries out copolymerization of the plurality, they are not cared about. Especially, a polymer which consists of a styrene system monomer from physical properties etc. and *tetralin*, an acrylic ester series monomer or output, is preferred. It is an acrylic polymer which consists of acrylic ester monomer and a methacrylic-acid-ester monomer (*m*eta)s more preferably, is an acrylic polymer which consists of acrylic ester monomer preferentially, especially, and is a polymer which consists of butyl acrylate still more preferably. A point that physical properties, such as hygroscopicity of a compound, a low modulus of a hardened material, high elongation, weatherability, and heat resistance, are required in a use of general [***] to a butyl acrylate system monomer is more preferred. A copolymer mainly concerned with ethyl acrylate on the other hand in a use as which oil resistance, such as an automotive application, etc. are required is also more preferred. It can also transpose a part of ethyl acrylate to butyl acrylate in order to raise that low-temperature characteristic, since it tends to be a little inferior to the low-temperature characteristic (cold resistance), although a polymer mainly concerned with this ethyl acrylate is excellent in oil resistance. However, since it follows on increasing a ratio of butyl acrylate and the good oil resistance is applied, for the ratio, for a use of which oil resistance is required, it is preferred to carry out to 40% or less, and also it is more preferred to make to 30% or less. In order to improve the low-temperature characteristic, without spilling oil resistance, it is also preferred to use acrylic acid 2-methoxyethyl, acrylic acid 2-ethoxyethyl, etc. by which oxygen was introduced into an alkyl group of a side chain. However, since it is in a tendency for heat resistance to be inferior by introduction of an alkoy group which has an ether bond in a side chain, when heat resistance is required, it is preferred [the ratio] to make it to 40% or less. It is possible to obtain a polymer which changed the ratio and was suitable in consideration of physical properties needed, such as oil resistance, heat resistance, and the low-temperature characteristic, according to a various application, and the purpose demanded. For example, as an example which is excellent in properties balance, such as oil resistance, heat resistance, the low-temperature characteristic, although ethyl ester is not carried out, a copolymer of ethyl acrylate / butyl acrylate / acrylic acid 2-methoxyethyl (K = 40/20/20 (at a weight ratio)) is mentioned. In this invention, it is preferred other monomers, copolymerization, and also that may carry out block copolymerization and these desirable monomers are contained not less than 40% by a weight ratio in these desirable monomers in that case. Acrylic acid (*m*eta) expresses acrylic acid and / or methacrylic acid with the above-mentioned expressive form.

[0156] (Meta) is not limited but what is necessary is just to carry out by a publicly known method especially as a synthetic ester system copolymer (*A*(*B*). However, it has the problem that a polymer obtained by the usual radical polymerizing method using an aromatic compound, a peroxide, etc. as a polymerization initiator generally has a value of molecular weight distribution as large as two or more, and viscosity becomes high. Therefore, molecular weight distribution is narrow, and in order to obtain an acrylic ester system copolymer which has a cross-linking functional group in molecular chain terminals at a high ratio (*m*eta), it is preferred it is an acrylic ester system copolymer with low (meta) viscosity, and] to use living-radical-polymerization together two or more sorts. Specifically, a polyalkylene series polymer which has a reactive silicon ester system copolymer with low (meta) viscosity, and] to use living-radical-polymerization

method.

[0157] "Living-radical-polymerization method," an organic halogenated compound or a sulfonyl halide compound. An initiator. An atom-transfer-radiical-polymerization method" which polymerizes an acrylic ester (*m*eta) system monomer by making a transition metal complex into a ligand. As a manufacturing method of an acrylic ester system copolymer which in addition to the feature of the above-mentioned "living-radical-polymerization method" has a halogen comparatively advantageous to a functional group combination reaction etc. at the end, and has a specific functional group from flexibility of a design of an initiator or a catalyst being large (*m*eta). It is still more desirable. 117 volumes, 551 pages, etc. will be mentioned as the atom transfer radical polymerization method in Majuszyński et al., and journal OBU American chemical society (J. Am. Chem. Soc.) [99].

[0158] A hardened material produced by hardening a hardenable constituent containing an acrylic ester system copolymer which has a reactive silicon group (*m*eta) may have low elongation as compared with a hardenability constituent containing an organic polymer which has other principal chain skeleton, such as a polyalkylene series polymer. Even if it uses an acrylic ester (*m*eta) system copolymer manufactured using the above "living-radical-polymerization method" and an atom-transfer-radiical-polymerization method" elongation may be insufficient, and endurance may be bad. As compared with an organic polymer which can improve not only the endurance of this (*m*eta) acrylic ester system copolymer by using a silicon on silicon containing functional group which has three or more hydroxyl bases as a reactive silicon group, and has other principal chain skeletons, an endurance improvement effect is large.

[0159] It is a general formula in an acrylic ester system copolymer which has the above-mentioned reactive silicon group (*m*eta) (6) :

$$-\text{Si}(\text{OR}')_3$$

Especially (*A*(*B*) ingredient expressed with (6) in formula is the same as the above (*m*eta) can be used as an ingredient. Heat resistance based on an acrylic ester (*m*eta) system copolymer of a principal chain skeleton in this (*A*(*B*) ingredient. Although a process which is excellent in weatherability and chemical resistance, and there is no generation of methanol accompanying a hydrolytic reaction of a reactive silicon group, and it is a polymer whose stability of a hardened material, endurance, and creep resistance are still better.

[0160] It is a general formula in an acrylic ester system copolymer which has a reactive silicon group (*m*eta) (6) :

$$-\text{Si}(\text{OR})_3$$

Especially (*A*(*B*) ingredient of the free radical polymerizing method for having used a chain transfer agent for JP-HB-1408B, JP-HB-5544A, JP-HB-2119Z2A, etc. is indicated. As compared with an atom-transfer-radiical-polymerization method for JP-HB-2727A, etc. is indicated, it is not limited to in particular these.

[0161] It is a general formula in an acrylic ester system copolymer which has the above-mentioned reactive silicon group (*m*eta) (6) :

As a polymerization method of the aforementioned (*A*(*B*) ingredient, when a living-radical-

polymerization method is used, since molecular weight distribution is narrow, it is hyperviscosity, and from the ability to introduce a cross-linking functional group into molecular chain terminals at a high ratio, it is more desirable and especially an atom-transfer-radiical-polymerization method is preferred.

[0162] An acrylic ester system copolymer which has the above-mentioned reactive silicon group (*m*eta), may be used alone, and may be used together two or more sorts.

[0163] An organic polymer which has these reactive silicon groups may be used alone, and may be used together two or more sorts. Specifically, a polyalkylene series polymer which has a reactive silicon

http://www4.ipdl.int/patent/gpj/cgi-bin/jpnweb.cgi?file=2Fwww4.ipdl...

A saturated hydrocarbon system polymer which has a reactive silicon group, an acrylic ester system copolymer which has a reactive silicon group (meta), and an organic polymer blends two or more sorts chosen from a group, ** and others, can also be used.

[0165] A manufacturing method of an organic polymer which blends a polyoxaylene series polymer which has a reactive silicon group, and an acrylic ester system copolymer which has a reactive silicon group (meta). Although proposed by JP 55-122551 A, JP 63-112642 A, JP 68-172631 A, JP/H1-161563 A, etc., it is not limited to in particular these.

[0166] It is known as compared with a case where a polyoxaylene series polymer is independently used for an organic polymer which blends a polyoxaylene series polymer which has this reactive silicon group, and an acrylic ester system copolymer which has a reactive silicon group (meta) that stability is bad. Then, the above-mentioned general formula (6) is a polyoxaylene series polymer component in the aforementioned organic polymer to blend :



A polyoxaylene series polymer (A5) which has a basis expressed with $(R^{\text{kin}}$ formula) is the same as that above is used. An organic polymer blended with an acrylic ester system copolymer (A6) which has a reactive silicon group (meta) has outstanding stability, and drop strength based on an ingredient (A5) are shown.

[0167] A desirable example of an acrylic ester (meta) system copolymer of an ingredient has a reactive silicon group, and a chain is a following general formula substantially (14) :

[0168] [Formula 3]

$$\text{—CH}_2\text{—C—COOR}^5 \quad (14)$$

The acrylic ester monomer unit which has an alkyl group of the carbon numbers 1~8 expressed with a hydrogen atom or a methyl group, and R^{11} show the alkyl group of the carbon numbers 1~8 among a formula, as for R^{10} (meta), and following general formula (15) :

[0169] [Formula 4]

$$\text{—CH}_2\text{—C—COOR}^{10} \quad (15)$$

as R^{11} said general formula (14) --- the carbon numbers 1~8 of a methyl group, an ethyl group, a propyl group, n-butyl group, t-butyl group, a 2-ethylhexyl group, etc. --- desirable 1~4 --- an allyl group of 2 is raised still more preferably. An alkyl group of R^{11} may be independent and may be mixed two or more sorts.

[0170] As R^{11} said general formula (15) --- ten or more carbon numbers of a lauryl group, a tridecyl group, a cetyl group, a stearyl group, a behenyl group, etc. --- usually --- 10~30 --- a long-chain alkyl group of 10~20 raised preferably. Like a case of R^{11} , an alkyl group of R^{12} may be independent and may be mixed two or more sorts.

[0171] Although a chain of a **(meta) acrylic ester system copolymer consists of a monomeric unit of a formula (4) --- ten or more carbon numbers of a lauryl group, a tridecyl group, a cetyl group, a stearyl group, a behenyl group, etc. --- usually --- 10~30 --- a long-chain alkyl group of 10~20 raised preferably. Like a case of R^{11} , an alkyl group of R^{12} may be independent and may be mixed two or more sorts.

[0172] As for an abundance ratio of a monomeric unit of a formula (4), and a monomeric unit of a formula (15) 40~40 are preferred at a weight ratio, and 90~10~10~10 are still more preferred.

[0173] As monomeric units other than a formula (4) which may be contained in this copolymer, and a formula (15). For example, acrylic acid, such as acrylic acid and methacrylic acid; Acrylamide, Amide groups, such as methacrylamide, N-methacryloylamide, and N-vinylmethacrylamide; Epoxy groups, such as glycidyl acetate and glycidyl methacrylate; Diethylamino ethyl acrylates, diethylamino ethyl methacrylates, A monomer containing amino groups, such as amineoethyl acrylate, alpha-methylstyrene, allyl vinyl ether, VCM/PVC, vinyl acetate, vinyl propionate, ethene, etc. in addition to this is raised.

[0174] Although an organic polymer which has a saturated hydrocarbon system polymer which has a reactive silicon group, and an acrylic ester system copolymer which has a reactive silicon group (meta) is proposed by JP 11-168716 A, JP 2000-186176 A, etc., it is not limited to in particular these.

[0175] As for an abundance ratio of a monomeric unit of a formula (4), and a monomeric unit of a formula (15) 40~40 are preferred at a weight ratio, and 90~10~10~10 are still more preferred.

[0176] As monomeric units other than a formula (4) which may be contained in this copolymer, and a formula (15). For example, acrylic acid, such as acrylic acid and methacrylic acid; Acrylamide, Amide groups, such as methacrylamide, N-methacryloylamide, and N-vinylmethacrylamide; Epoxy groups, such as glycidyl acetate and glycidyl methacrylate; Diethylamino ethyl acrylates, diethylamino ethyl methacrylates, A monomer containing amino groups, such as amineoethyl acrylate, alpha-methylstyrene, allyl vinyl ether, VCM/PVC, vinyl acetate, vinyl propionate, ethene, etc. in addition to this is raised.

[0177] Although an organic polymer which has a saturated hydrocarbon system polymer which has a reactive silicon group, and an acrylic ester system copolymer which has a reactive silicon group (meta) is proposed by JP 11-168716 A, JP 2000-186176 A, etc., it is not limited to in particular these.

[0178] A method of polymerizing an acrylic ester (meta) system monomer elsewhere under existence of an organic polymer which has a reactive silicon group as a manufacturing method of an organic polymer which blends an acrylic ester system copolymer which has a reactive silicon functional group (meta) can be used. Although this manufacturing method is concretely indicated by each gazette such as JP 59-148022/23 A, JP 59-188014 A, JP 60-228516 A, and JP 60-228517 A, it is not limited to these.

[0179] In the invention, silicate can be used as a (B) ingredient. This silicate has the function to improve the stability of an organic polymer which is the (A) ingredient of this invention, endurance, and creep resistance.

[0180] (3) Silicate which is an ingredient is a general formula (16).

Si(OH)₃ · R^{13} · (16)

R^{13} are a hydroxyl group or an alkyl group of the carbon numbers 1~20, an any group of the carbon numbers 6~20, and the univalent hydrocarbon group chosen from an aralkyl group of the carbon numbers 7~20 independently among a formula, respectively) --- they are tetra alkoxysilane expressed its partial hydrolysis condensate.

[0181] As an example of silicate, for example A tetramethoxy silane, a tetraethoxy silane, Ethoxy trimethoxysilane, dimethoxy diethoxysilane, Tetra propoxysilane, Tetra butoxysilane, Tetra butoxysilane, and tetra t-butoxysilane, and those partial hydrolysis condensates are raised.

[0182] [0171] (← inside of formula, and R^{10} --- the above --- to a copolymer which consists of an acrylic ester monomer unit which has a with a carbon numbers of ten or more alkyl group (meta)). It is the method of blending and manufacturing a polyoxaylene series polymer which has a reactive silicon group.

[0172] [0173] (← inside of formula, and R^{10} --- the above --- to a copolymer which consists of an acrylic ester monomer unit which has a with a carbon numbers of ten or more alkyl group (meta)). It is the method of blending and manufacturing a polyoxaylene series polymer which has a reactive silicon group.

26/64 $\wedge^{\circ} \rightarrow \circ$

Since a partial hydrolysis condensate of tetra alkoxy silane has an improvement effect of the stability of this invention, endurance, and creep resistance larger than tetra alkoxy silane, it is preferred.

At a time which was made to add and carry out partial hydrolysis of the water to tetralkoxysilanes by a commercial condensate of said alkoxylate for example, and was made as a partial hydrolysis method as a partial hydrolysis method. A commercial condensate can be used for a partial hydrolysis condensate of an ORGANIC silicate compound. As such a condensate, the methylsilicate 51, the ethyl silicate 49 all

[0184] PolySilicate (B) shows an improvement effect of sail better stability, endurance, and creep resistance by combining with an ingredient (A1) of this invention, an ingredient (A2), and the (A3) ingredient. By combining with an ingredient (A1) especially shows an improvement effect of good stability, endurance, and creep resistance.

[0185] As amount of ingredient used, 0.1 ~ 10 weight section is preferred to (A) ingredient 100 weight section. If loadings of an ingredient are less than this range, endurance, and creep resistance may not be enough, and a curing rate may become slow if loadings of the (B) ingredient exceed this range. The above-mentioned

[0186] carboxylic acid may be used only by one kind, and may carry out two or more kind mixture.

[0187] In this invention, carboxylic acid and tin salt can be used as a (C) ingredient. As compared with other silanol condensation catalysts, the stability of a hardened material obtained, emulsification, and creep resistance can be improved by using this carboxylic acid and tin salt as a silanol condensation catalyst of an organic polymer which is an ingredient (A1) of this invention.

[0188] Limitation in particular does not have carboxylic acid and tin salt (C) used for this invention, and various kinds of compounds can be used for it.

[0189] As carboxylic acid which has an acid radical of carboxylic acid tin salt (C), here, a carboxylic acid group, carbon content compound of a hydrocarbon system of 2-40 is suitably used for a carbon number including carboxylic carbons, and carboxylic acid of a hydrocarbon system of the carbon numbers 2-20.

(iii) It illustrates concretely, acetic acid, propionic acid, butanoic acid, valeric acid, caproic acid, *Eranthic acid*, adipic acid, 2-ethylhexanoic acid, palmitic acid, *o*-nitro acid, Undecanoic acid, lauric acid, may be especially used suitably from a point of availability.

asci, tridecylacid, myristio acid, nematacyd, acid, Pulmitio acid, heptadecylacid, stearic acid, nonadecanoic acid, behenic acid, lignoceric acid, carinic acid, monanic acid, malic acid, straight chain saturated fatty acid groups, such as RAKUSUERU acid, Undecylenic acid, Linder acidi, Tezuico acid, FIZTERIN acid, myristoleic acid, 2-hexadecenoic acid, 6-hexadecenoic acid, 7-

hexadecenoic acid, palmitoleic acid, a petroselinic acid, Oleic acid, elaidio acid, ASIJKUREPIN acid, vaccenic acid, gadoleic acid, Gondo In acid, a cetylene acid, erucic acid, brassidic acid, sebadeoleic acid, KISHIMEN acid, RUMENIC acid, acrylic acid, methacrylic acid, angelio acid, Monoenoic unsaturated fatty acid, such as crotonic acid, isocrotonic acid, and 10-undecenoic acid; Rano elaidio

acid, Linolic acid, 10,12-octadecadienoic acid, HIRAGO acid, alpha-eicosatrienoic acid, beta-eleostearic acid, puniceic acid, linolenic acid, 8 and 11, 14-eicosatrienoic acid, A 7,10,13-docosatrienoic acid.

4,8,11,14-hexadeca tetraenoic acid, MORURUCHI acid, arachidonic acid, 8,12 and 16,19-docosatetraenoic acid, 15,18-dicosatetraenoic acid, dilupanodienoic acid, herring acid, polyenoic acid, such as docosahexenoic acid; 1-methybutyric acid, isobutyric acid, Polene unsaturated Fatty acid, such as docosahexenoic acid; 2-ethylbutanoic acid, isovalerio acid, tuberculostearic acid, Branch fatty acid, such as a pivalic acid

PUROPI all acid, a tauric acid; Fatty acid with triple bonds, such as steer roll and neo-decanoic acid; KISHIMONIIN acid, and 7-hexa-crepa-de-Chine acid; OAIKUNI napthenic acid; A-acid, a crepanenic acid; HINDONOIN acid, and chitosanone acid; Alluvial carboxylic acid; such

isopropylbenzoic acid, terephthalic acid, and tolualic acid; aromatic polyacids, such as phthalic anhydride, terephthalic acid, and isophthalic acid; and phthalic anhydride, terephthalic acid, and isophthalic acid, each with a hydroxyl group at one or both ends.

[0190] Especially acquisition is easy, and is cheap and a point that compatibility with an ingredient (A) good to said carboxylic acid has 2-ethylhexanoic acid, octyl acid, neo decanoic acid, oleic acid, arginine, cysteine, methionine, proline, and methionine, is memorable.

[0191] When the melting point of said carboxylic acid is high (crystallinity is high), the melting point becomes high, in a smaller portion and it is hard to deal with naphthalene acid in salt which has the acid radical.

(workability -- bad). Therefore, as for the melting point of solid carboxylic acid, it is preferred that it is especially -40°C or less, it is more preferred that it is -50-50 °C, and it is especially preferred that it is -60-60 °C.

[1192] when a carbon number of said carboxylic acid is large (a molecular weight is large), it becomes liquefied and carboxylic acid tin salt which has the acid radical becomes a thing which has a high viscosity and which is hard to deal with, it (fusco-alkaline, — hard). On the contrary, when a carbon number of said carboxylic acid is small which is low (a molecular weight is small), it becomes a thing which has a low viscosity and which is easy to deal with.

state or viscosity and which is hard to heat melt. If you naturally want to use it, then you can do so, but when a carbon number of said carboxylic acid is small [a molecular weight is small], including carboxylic acid metal salt may fall [carboxylic acid in salt which has the acid radical], including mostly an ingredient which volatilizes easily with heating. Especially on conditions (thin layer) which

extended a constituent thinnly, volatilization by heating may be large and catalyst activity or carbonic acid metal salt may fall greatly. Therefore, as for said carboxylic acid, it is preferred that carbon numbers including carbon of a carbonyl group are 2-20, it is more preferred that it is 6-17, and it is preferred that it is especially 8-12.

[093] It is preferred that it is the tin salt of the ease (workability, viscosity) of dealing with it carboxylic acid tin salt to di carboxylic acid or monocarboxylic acid, and it is more preferred that the tin salt of monocarboxylic acid.

[0194] As said monocarboxylic acid tin salt, it is a general formula (17);
Sn(OCOR)₂

carbon double bond.) Two RCOO- -bases may be the same and may differ. A divalent Sn compound expressed or general formula (18):

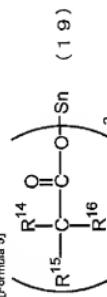
(It is the same as the above the inside R of a formula.) Two ROO⁻bases may be the same and differ. A tetravalent Sn compound is preferred. A divalent Sn compound expressed with mineral formula (17) from a point of hardenability and availability is more preferred.

[195] carbonoxy acid tin salt (i.e decandoic acid tin) in which said carboxylic acid tin salt (C) is carbonoxy acid tin salt, (2-ethylhexanoic acid is 3rd etc), and the 4th class carbon whose name of an alpha addition of a carboxyl group is the 3rd class carbon Phthalic-acid tin etc, are more preferred from a cost rate being quick, and especially carboxylic acid tin whose carbon atom which adjoins a carboxyl group is the 4th class carbon is preferred.

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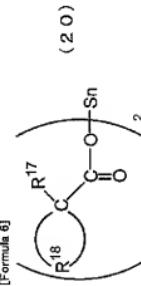
[01986] Especially in this invention, carbon of an alpha position of a carbonyl group uses carboxylic acid tin



[0199]

[0199] Among the formula, R^{14} , R^{15} , and R^{16} are the independent substitution or unsubstituted univalent organic groups, respectively, and may contain the carboxyl group) — the chain fatty acid tin (naphthalene-1,4-dicarboxylic acid, $R^{14}R^{15}C_6H_3(COO)_{2-n}$, $n = 0$, 1, 2).

preferred that it is 5-20, it is more preferred that it is 1-7, and it is preferred that it is especially 1-2. Since compatibility with an oxygenate may fail that it is easy to become a solid state (A1) and catalytic activity may fail if a carbon number increases more than this range it is not desirable. It is not desirable from on the other hand, volatility, the increases of a small, and the thin layer hardenability of a hardenable constituent failing, if there are few carbon numbers.



[0201] (Among the formulas A substitution or unsubstituted univalent organic group and R^{15} are substitution or unsubstituted divalent organic groups, and R^7 may contain thio carbonyl group, respectively.) It is also possible to use the following formulas:

Practices and a general formula (200)

[U202] [Exam 1a 7]

$$\text{R}^{19}-\text{C}(=\text{O})-\text{O}-\text{C}(=\text{O})-\text{O}-\text{Sn} \quad (21)$$

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acid. Dimethylmalonic acid, ethyl methylmalonic acid, 2,2-dimethyl ambar acid. Chain dicarboxylic acid, such as 2,2-dimethyl ambar acid and 2,2-dimethylisomeric acid. Chain trinorboxylic acid, such as 3-methyldisao citrate and 4,4-dimethylisomeric acid. 1-

etc. as mentioned. These can also be used although many compounds containing such a structure exist.

[2004] From a point that compatibility with an ingredient and workability are especially (A1) good, tin monocarbonylate is more preferred than a chain tin monocarbonylate is more preferred. Since acquisition is easy, acidic tin, the next decanoic acid tin, BSA, TGA acid tin, 2-dimethyloctanoic acid tin, especially 2-ethyl-2,5-dimethylhexane acidic tin, etc. are preferred.

and availability to dienol. Im is more preferred.

[2026] As for a carbon number of carbonyl acid which has an acid radical of an inured (C1), it is preferred that it is 5-20, it is more preferred that it is 6-17, and it is preferred that it is especially 12-17. Since compatibility with an inured agent may fail that it is easy to become a solid state (A1) and catalytic activity may fall if a carbon number increases more than this range is not desirable. It is not desirable from on the other hand, volatility, a increase of a smell, and that layer hardens of a hardness constant falling. There are few carbon numbers.

[2027] As an Ingredient, from these points (C1) Neo decanoic acid tin (divalent), BASA tic acid tin (divalent), 2,2-dimethyloctanoic acid tin (divalent), Neo decanoic acid tin (tetravalence), BASA tic acid tin (tetravalence), 2,2-dimethyl octanoic acid tin (tetravalence).

[208] especially 2-ethyl-2-methyloxane (or terpineane) are preferred.

life becomes short too much, and workability may worsen, and it is not desirable from a point of storage stability.

[2025] The (C) ingredient and (C1) an ingredient can be used combining two or more sorts besides using

[0210] On the other hand, only of the (C) ingredient and (G1) an ingredient, activity is low, and when atoms.

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diethylenetriamine, triethyltetramine, tetrahydrohexylamine, benzylamine, Diethylamine, propylamine, xylylene diamine, ethylaspiramine, Hexamethylenediamine, dodecamethylene diamine, dimethylbenzylamine, triethylenediamine, guanidine, diphenyl guanidine, NN,N'-N,N'-tetramethyl ethylene diamine, 2,4,6-trimethylaminobiphenyl, 1,3,4-butanediamine, NN,N'-N,N'-tetramethyl ethylene diamine, 2-ethyl-4-methylimidazole, 1, and 8-diazabicyclo (5. 4. 0) undecene (7 (DBU) etc. are mentioned. It is not preferred from a point of workability.

[0213] As for loadings of said amine compound, about 0.01-20 weight sections are preferred to organic polymer (100 weight section of an ingredient (A1), and also its 0.1 to 5 weight section is more preferred). A curve rate may be seen that loadings of an amine compound are less than 0.01 weight sections, and hardening reaction becomes fully difficult to advance. On the other hand, if loadings of an amine compound exceed 20 weight sections, pot life may become short too much and is not preferred from a point of workability.

[0214] In this invention, an organic tin catalyst can be used as a (D) ingredient. When this organic tin catalyst is used as a silicon condensation catalyst of an organic polymer which has a reactive silicon group, as compared with other silicon condensation catalysts, a hydrophilic constituent with high catalytic activity, and good depths hardenability and an adhesive property is obtained. However, according to an addition of this organic tin catalyst, the stability of a hardened material of a hardenability constituent obtained, endurance, and creep resistance fall.

[0215] A hardenability constituent which added an organic tin catalyst of the (D) ingredient by using an organic polymer which is an ingredient (A1) of this invention as a polymer component, Catalytic activity is high, and depth hardenability, and an adhesive property are good, and the stability of a hardened material obtained, endurance, and creep resistance can be maintained highly.

[0216] In using adhesives or a sealing material, which on the other hand, contains an organic polymer which has a reactive silicon group as the main ingredients for a use which needs endurance, it uses carboxylic acid and tin salt of the aforementioned (C) ingredient as a curing catalyst in many cases; however, if this carboxylic acid and tin salt is used as a curing catalyst, when it will be alkali around a masonry joint and a sealing material will remain by a thin layer, it's hard to harden that thin layer portion, and may remain on conditions of heat and high humidity especially with unhardened. On the other hand, if said organic tin catalyst (D) is used as a curing catalyst, as mentioned above, stability and endurance will fall, but the hardenability of a thin layer part is good. Then, if an organic tin catalyst of an organic polymer and the (D) ingredient of this invention is combined, the hardenability of a thin layer part can be improved notably, maintaining the stability of a hardened material obtained, and endurance highly.

[0217] However, even if it combines with an organic polymer which is an ingredient (A1) of the invention, depending on an addition of an organic tin catalyst of the (D) ingredient, stability and endurance may fall a little. Then, it is more preferable to decrease the quantity of an addition of the (D) ingredient to such an extent that carboxylic acid tin salt of the (C) ingredient is used together and sufficient hardenability, depths hardenability, an adhesive property, and thin layer hardenability are acquired with an organic tin catalyst of the (D) ingredient as a curing catalyst.

[0218] As an example of said organic tin catalyst (D), they are dialkyl tin oxides, diaryl tin oxide, and a general formula (22).

$$Q_1Sn(O_2)_x \sim Q_2Sn(O_2)_y \quad (22)$$

(22) expresses among a formula which has a functional group with which Q can form a coordinate bond in an inside of a univalent carbon group of the carbon numbers 1-20, or for a univalent hydrocarbon group of the carbon numbers 1-20, if x is 0, 1, 2, or 3, A compound etc. which are shown are shown. Tetraalkyl tin compounds, such as diethyl tin oxide and dialkyl tin diacetate, If useable as a (D) ingredient also in a reactant with a low molecular silicon compound which has hydroxyl silicon groups, such as a tetraethoxysilane, methyl triethoxysilane, diphenylmethoxysilane, and phenyltrimethoxysilane. Since activity as a silanol condensation catalyst

is high, chelate compound and tin alcohols, such as a compound shown by a general formula (22) also in these, i.e. dialkyl tin bisacetylacetone etc., are more preferable.

[0219] As an example of said dialkyl tin carboxylate, For example, dibutyltin dilaurate, dibutyltin diacetate, a dimethyltin diethoxyhexane rate. Dibutyl tin JUKUTETO, dibutyl tin dimethyl malate, dibutyl tin diethyl malate, Dibutyl tin diurethane, dibutyl tin disuccinic malate, dibutyl tin tridecanoate, dibutyl tin dienoate, dibutyl tin maleate, diethyl tin diacetate, diethyl tin dilaurate, diethyl tin diisooctyl malate, etc. are mentioned.

[0220] As an example of said dialkyl tin oxide, diethyl tin oxide, a mixture of dibutyl tin oxide and phthalic ester, etc. are mentioned.

[0221] If said chelate compound is illustrated concretely,

[0222] [Formula 8]

[0223] [Formula 9]

[0224] [Formula 10]

[0225] [Formula 11]

[0226] [Formula 12]

[0227] [Formula 13]

[0228] [Formula 14]

[0229] [Formula 15]

[0230] [Formula 16]

[0231] [Formula 17]

[0232] [Formula 18]

[0233] [Formula 19]

[0234] [Formula 20]

[0235] [Formula 21]

[0236] [Formula 22]

[0237] [Formula 23]

[0238] [Formula 24]

[0239] [Formula 25]

[0240] [Formula 26]

[0241] [Formula 27]

[0242] [Formula 28]

[0243] [Formula 29]

[0244] [Formula 30]

[0245] [Formula 31]

[0246] [Formula 32]

[0247] [Formula 33]

[0248] [Formula 34]

[0249] [Formula 35]

[0250] [Formula 36]

[0251] [Formula 37]

[0252] [Formula 38]

[0253] [Formula 39]

[0254] [Formula 40]

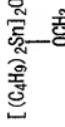
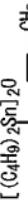
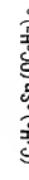
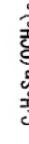
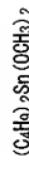
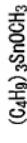
[0255] [Formula 41]

[0256] [Formula 42]

[0257] [Formula 43]

[0258] [Formula 44]

[0259] [Formula 45]



[0225] Although #4 is mentioned, it is not limited to these. In these, a diisobutyltin JIARUKOKI side is preferred. Especially the dibutyltin JIMETOKI side is low cost, and since it is easy to receive, it is preferred.

[0226] (D) As amount of ingredient used, about 0.01~0.2 weight sections are preferred for ingredient (A) 100 weight section, and also about 0.1~1.0 weight sections are preferred. Since a cure rate may become slow and a hardening reaction will become fully difficult to advance if loadings are less than this range, it is not desirable. On the other hand, if loadings exceed this range, working life becomes short too much, and workability may worsen, and it is not desirable from a point of storage stability.

[0227] (E) As amount of [in case used of using the (D) ingredient and the (C) ingredient together as a curing catalyst], (A) is preferred to consider it as (C) Ingredient 0.5~20 weight section, and (D) is more preferred to consider it as (C) ingredient~10 weight section to Ingredient 100 weight section, and also it is more preferred to consider it as (D) ingredient~0.02~0.2 weight section. (C) When loadings of an ingredient are less than this range, a cure rate may become slow, when loadings exceed this range, working life becomes short too much and workability may worsen. (D) The stability of a hardened material which will be obtained is an improvement of hardness/depths of hardenability, an adhesive property, and thin layer durability may not be enough if loadings of an ingredient are less than this range, and loadings exceed this range, endurance, and creep resistance may worsen.

[0228] (D) The (D) ingredient can be used combining two or more sorts besides using it alone.

[0229] In this invention, a non-tin catalyst can be used as a (E) ingredient. This non-tin catalyst has a function which improves the stability of a hardened material obtained, endurance, and creep resistance as compared with other alanol condensation catalysts, when it uses as a silanol condensation catalyst of an organic polymer which is an ingredient (A) of this invention. A non-tin catalyst which is the (E) ingredient is an eco-friendly curing catalyst; with high social needs.

[0230] As a non-tin catalyst which is the (E) ingredient, which can be used for this invention, although there is no restriction in particular, an organic metallic compound containing carboxylic acid, carbonylic acid metal salt other than carboxylic acid tin salt, organic sulfonic acid, alkyl acid phosphate and 3B follows, and 4A group metal, etc. are illustrated.

[0231] The various above-mentioned carboxylic acid which has an acid radical of carboxylic acid tin salt which is the (C) ingredient as carboxylic acid salt can be illustrated.

[0232] As for said carboxylic acid, it is preferred like carboxylic acid tin salts (C) that carbon numbers including carbon of a carboxyl group are 2~7, it is more preferred that it is 8~17, and it is preferred that it is especially 9~12. A point to dicarboxylic acid or monocarboxylic acid of the ease (workability), viscosity of dealing with it of carboxylic acid is preferred, and monocarboxylic acid is more preferred. carboxylic acid (mono decanoic acid), in which said carboxylic acid is carboxylic acid (2-ethylhexanoic acid etc.) and the 4th class carbon whose carbon atom has an alpha position of a carboxyl group is the 3rd class carbon A pivalic acid etc., are more preferred from a cure rate being quick, and especially carboxylic acid whose carbon atom which adjoins a carboxyl group is the 4th class carbon is preferred.

[0233] Especially as carboxylic acid, 2-ethylhexanoic acid, neo decanoic acid, BASA tic acid, 2,2-dimethylbutyric acid, and "ethyl-2,2-dimethylhexane acid are preferred from a point of availability, hardenability, and workability.

[0234] As carboxylic acid metal salts other than said carboxylic acid tin salt, metal salt of the various above-mentioned carboxylic acid can be used conveniently.

[0235]

[0247] By carboxylic acid, carboxylic acid metal salt other than carboxylic acid in salt, organic sulfonic acid, and alkyl acid phosphate, activity is low, and when moderate hardenability is not acquired, an amine compound can be added as a co-catalyst.

[0248] As various amine compounds, the indicated various above-mentioned amine compounds can be used as a co-catalyst of carboxylic acid tin salt (C).

[0249] As for lead of said amine compound, about 0.01~20 weight sections are preferred to organic material (D) weight section of an ingredient (A), and also its 0.1~10 weight section is more preferred. A cure rate may become lower than leadings of an amine compound are less than 0.01 weight sections, and a hardening reaction becomes fully difficult to advance. On the other hand, if leadings of an amine compound exceed 20 weight sections, pot life may become short but this is not preferred from a point of workability.

[0250] As a metal system compound or non-, besides carboxylic acid metal salt, other than said carboxylic acid salt, an organic metallic compound containing 3B elements and 4A group metal is raised, and although a titanate organic compound, an organozirconium compound, titanium acetoxoacetato, titanium ethyloxoacetato, compound, an organic boron compound, etc. are preferred from a point of activity, it is not limited to these.

[0251] As said titanate organic compound, tetraethyl titanate, Tetrabutyl titanate, tetraalkyl titanate, tetra(2-hydroxyethyl titanate), Chelate compound, such as titanium chelate, such as titanium alkoxides, such as triethanolamine titanate, titanium tetrakis acetylacetato, titanium ethyloxoacetato, octylenediamine, and titanium acetate, etc. are raised.

[0252] As said organozirconium compound, aluminum isopropylate, Aluminum alkoxides, such as mono sec-butyloty aluminum difluoropropoxide and aluminum sec-butylate, aluminum chloride, such as aluminum tris acetylacetato, aluminum bis-acetylacetato, and diisopropoxy aluminum ethylacetacetato, is raised.

[0253] As said zirconium compound, zirconium tetrapropylammonium PORKSADCO, Zirconium alkoxides, such as a zirconium tetra-n-PURPO4 and zirconium normal butyrate, Zirconium chelate, such as zirconium tetra acetylacetato, zirconium mononitro acetone, zirconium acetate, zirconium bis-acetylacetatoe, zirconium bis-ethylacetacetatoe, and zirconium acetate, is raised.

[0254] Although **** concordant use is also possible so, these titanata organic compounds, an organozirconium compound, an organic zirconium compound, an organic boron compound, etc., it is desirable in a viewpoint which can reduce the amount of catalyst used especially according to concordant use with said amine compound or an alkyl acid phosphate compound since it is possible to improve activity, and more desirable in a viewpoint of adjustment of working life in hardenability and ordinary temperature in an elevated temperature.

[0255] (E) An amount of ingredient used, about 0.01~20 weight sections are preferred to ingredient (A) 100 weight section, and also about 0.5~10 weight sections are preferred. Since a cure rate may become slow and a hardening reaction will become fully difficult to advance if leadings are less than this range, it is not desirable. On the other hand, if leadings exceed this range, working life becomes short too much, and workability may worsen, and it is not desirable from a point of storage stability.

[0256] The (E) ingredient can be used combining two or more sorts besides using it alone.

[0257] In this invention, a minute hollow body can be used as a (F) ingredient. While improving the workability (****), thixotropy of a constituent notably is indicated to JP-H11-35923A or JP-H11-31072A if this minute hollow body is used, it is known that a weight saving of a constituent and low-costizing are possible. However, it is known that the stability of a hardened material of a hardenability.

constituent and hardenability which are obtained will fall according to an addition of this minute hollow body.

[0258] The hardenability constituent which added a minute hollow body of the (F) ingredient by using an organic polymer which is an ingredient (A) of this invention as a polymer component can maintain highly the stability of a hardened material and endurance which are obtained, improving workability (*****) notably.

[0259] As for average particle density of a balloon, which is the (F) ingredient of this invention is a hollow body by which a diameter was preferably controlled from material of μ meters of 500 micrometers or less, quality of organic polymer mm or less as indicated, for example on stated-in-the-art of a functional filter (CMC). An ingredient in particular is not limited but it is [Ingredient] usable in various kinds of publicly known balloons.

[0260] As for average particle density of a balloon, it is preferred that it is 0.01~1.0 μ /cm³. It is more preferred that it is 0.03~0.7 μ /cm³, and it is preferred that it is especially 0.1~0.5 μ /cm³. If tensile strength of a hardened material may fall if average particle density is less than this range, and average particle density exceeds this range on the other hand, a workability improvement effect may not be enough.

[0261] An inorganic system balloon is more preferred than a point of stability and endurance to an organic system balloon.

[0262] As said inorganic system balloon can illustrate silicic acid system balloon and a non-silicic acid system balloon, and on a silicic acid system balloon, silica balloon, silicon balloon, a carbon balloon, etc. If ash balloons, can illustrate an alumina balloon, a zirconia balloon, a carbon balloon, etc. on a non-silicic acid system system balloons, as an example of these inorganic system balloons, a melt balloon, a melt light by JICHIH Steel Co., Ltd., and glass balloons, KARUN by Nippon Sheet Glass Co., Ltd., The Sunimontu 3M oil star 2~28, MICRO BALLOON made from EMERSON & LUMING, CRYSTALIC GLASSMODULE made from PITTSBURGH CORNING, AG Glass BUBBLES made from MA, FLUIDA line made from Fuji SHIRISHI Chemicals, and silica balloon, as O-COOL by Asahi Glass Co., Ltd., SAIRISU made from FUJI SHIRISHI Chemicals, and (ly) ash balloons, CEROSPHERES made from PFANAKERETING, FILLIATE made from FILITE U.S.A., AS an eluminium balloon, as BW by Showa Denko KK, and a zirconia balloon HOLLOW ZIRCONUM SPHERES made from ZIRCOA, KUREBALLOON, KUREBALLOON, KUREBALLOON, and product, one has fair made from GENERAL TECHNOLOGIES are marketed as a carbon balloon.

[0263] A balloon of thermosetting resin and a balloon of thermoplastics can be illustrated as said organic system balloon, a phenol balloon, Union Carbide UCAR and a silica balloon, as O-COOL by Asahi Glass Co., Ltd., SAIRISU made from FUJI SHIRISHI Chemicals, and (ly) ash balloons, CEROSPHERES made from PFANAKERETING, FILLIATE made from FILITE U.S.A., AS an eluminium balloon, a polyacrylate balloon, a polyvinyl alcohol balloon, and a styrene acrylic balloon at a thermoplastic balloon. A balloon of thermoplastics which constructed the bridge can also be used. A balloon after foaming may be sufficient, and a balloon here is made to foam, after blending a thing containing a foaming agent, and is good also as a balloon.

[0264] As an example of those organic system balloons, as a phenol balloon, Union Carbide UCAR and PHENOLIC MICROBALLOONS. As an open balloon ECOSPHERES made from EMERSON & LUMING, AS a urea balloon, ECOSPHERES UF-O made from EMERSON & LUMING, AS a zirconium balloon, SARAN MICROSPHERES made from DOW CHEMICAL, Expanded made from Japanese filament, MATSUMOTO Yoshi-Sekanya Matsumoto microsphere, As a polystryrene balloon, DYLITE EXPANDABLE POLYSTYRENE made from ARCO POLYMERS, SM383 by Japan Synthetic Rubber Co., Ltd. (P) are marketed by EXPANDABLE POLYSTYRENE BEADS made from BASF WYANDOTE, and constructed type a styrene acrylic solid balloon of a bridge.

[0265] The above-mentioned balloon may be used alone, and two or more kinds may be mixed and it may be used. The surface of these balloons Fatty acid, fatty acid ester, rain. What was processed in order.

to improve dispersability and the workability of a compound by rosin and lignin, a silane coupling agent, titanum coupling agent, aluminum cup agent, a polypropylene glycol, etc. can be used. Without spoiling pliability, and elongation and intensity among physical properties at the time of stiffening a compound, these telicons are used in order to enjoy a weight saving and to cut down the cost. [0266]

[See.] At this invention it is a general formula as a (G) ingredient (I):

$- \text{SiR}_3^{\text{C}}(\text{OR}^{\text{C}})^2$ (7)

(C^{R} is an organic group of monovalence of the carbon numbers 1-20 independently among a group of monovalence of the carbon numbers 2-20 independently, respectively, 3- C^{R} is an organic group of monovalence of the carbon numbers 1, or 2 — an aminalane coupling agent which has a basic expressed can be used. General formula (6) which is the (A4) ingredient of this invention about this (G) ingredient:

While having stability, endurance, and energy resistance outstanding by adding to an organic polymer which has a basic expressed with R_1 (an amine is the same as above), becomes a hardenerous constituent in which an outstanding adhesive property is shown. To a reactive silicon group of this (G) ingredient. If an ester exchange reaction between reactive silicon groups of the (G) ingredient and the (AA) ingredient advances after mixing with the (AA) ingredient since it does not have a methyl group as an alkoy group combined with a silicon atom, a reactant high methoxy silanol group does not generate to a reactive silicon group of the (AA) ingredient. Therefore, a hardenerous constituent containing the (G) ingredient and the (AA) ingredient is before and after storage, and turns into a hardenerous condition with little change of a cure rate. A reactive silicon group of this (G) ingredient and the (AA) ingredient. Since a carbon number of an alkoy group combined with a silicon atom is 2 to 20, toxic high methanol is not contained in alcohol generated in connection with a hydrolysis reaction of a high silicon group when hardenerous constituents carries out.

[0268] Although it is usable as a many liquid, such as 1 liquid type and a two-component type, 1 type constituent, when it is considered as 1 liquid type, since said hardenability constituent which consists of an ingredient and a (A) ingredient has a large effect, which makes a small especially change of a cure rate in storage order, it is preferred.

[0269] (G) An ingredient is a compound which has a reactive silicon group expressed with a general formula

sil group, a trisiloxane sil group, a methylsiloxy sil group, a methoxy sil group, etc., can be mentioned. An alkyl group combined with a silicon atom of a reactive silicon group has a preferred rate of ethoxy sil group from a viewpoint of a reaction with a hydroxyl group in connection with a hydrolysis reaction, and its ethoxy sil group is more preferred. From a viewpoint of a cure rate, as for the case of an alkyl group combined with one silicon atom of a reactive silicon group, two or more pieces are preferred, and its three pieces are more preferred. The toxicity of alcohol generated in connection with a hydrolysis reaction and a viewpoint of a cure rate to a triethoxy sil group is the most preferred.

As an example of an ingredient, (G) gamma-aminopropyl triethoxysilane, gamma-aminopropyl methoxydiethoxysilane, gamma-(2-aminoethyl) aminopropyl triethoxysilane, gamma-(2-aminoethyl) aminopropyl triethoxysilane, gamma-ureido propyl triethoxysilane, gamma-ureido amino triethoxysilane, gamma-ureido

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[27/11] The (G) ingredient used for this invention is used in 0.1-10 copies to 100 copies of organic polymer(s) or of the (A4) ingredient. It is preferred to use it in 1-5 copies especially. The above-mentioned (G) ingredient may be used only by one kind, and may carry out two or more kind mixing use.

(A) A dehydrator may be added when using a *l*-liquid type constituent, a component which consists of an ingredient and a (G) ingredient. Especially when used as dehydrator, it is not restricted but one can obtain an amine group after a silicon in physical properties after a silicon treatment. Since there is no alkoxyl group and no amine group, a dehydrator is mainly used at low temperature comparatively since an amine exchange reaction with a reactivity of the amine group is small and the drying effect is high, it is desirable. Since the ion of an alkoxyl group is large, it has a strong effect on the ion exchange reaction. In addition, the ion of an amine group is small and it has a strong effect. Specifically, alkoxylbenzene, such as methoxybenzene and phenoxirbenzene, is preferred from points of view of the higher dehydrating effect, the higher solubility and the lower cost.

such as the drying effect, hardenability, availability, and the tension physical properties of a hardened material.

At this invention, it is a general formula as a (H) ingredient (B) :

$$\text{R}^1 - \text{SR}^2 - (\text{OCH}_2)_n (\text{OR}')_m - \text{R}^{1-n}$$

(8)

R^1 is an organic group of monovalence of the carbon numbers 1-20 independently among a group of 3-d-e individual is an organic group of monovalence of the carbon numbers 1-20 independently among a group of 2-d individual, respectively. R' of a 3-d-e individual shows 0, 1 or 2. However, 3-d-e numbers 2-20 independently, respectively. It shows 0, 1 or 2 and e shows 2, or 3. However, 3-d-e > 2-0 shall be satisfied. An aminosilane coupling agent which has been expressed can be used.

[273]

If it is incorporated with beforehand, a hydrophilicity constituent added to an organic polymer which has been expressed with $(R_1)_n$ formula, it is the same as the above). (It) An ester exchange reaction between the hydrophilicity group of an ingredient and a reactive silicon group of the (AA) ingredient advances, and a mercant high methoxy siloxane group generates to a reactive silicon group of the (AA) ingredient.

[0274] (H) Desirable care-of-hazardous conditions said hardenable constituents consists of a trans esterification catalyst and an ingredient, and a (A) ingredient. Since it changes with existence of a trans esterification catalyst and an additive, ester exchange reaction activity of a reactive silicon group of the (H) ingredient and the (A) ingredient, etc. are not generally decided, but as a trans esterification catalyst, When it includes three copies of T_1 system catalysts in a system, in a low temperature service, $10\text{--}20\text{--}30\text{--}40^\circ\text{C}$ for which it is recuperated comparatively one week, or more, while having outstanding adhesive property, stability, endurance, and creep resistance.

is preferred, and it is preferred that more than a day recuperates from a hot day to a cold temperature service.

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(ii) An independent auditor has a reporting obligation imposed with a financial formula

An alkene is a compound which has a reactive silicon group expressed with a general formula $R_2Si=CR_2$. As an example of a reactive silicon group expressed with a general formula $R_2Si=CR_2$, we can mention the following: a methyl diethoxy alkene group, an ethoxy methoxy methoxy alkene group, a methyl diethoxy alkene group, an ethoxy diethoxy alkene group, a methyl diethoxy alkene group, a methyl diethoxy alkene group, a diethoxy methoxy methoxy alkene group, etc. It can be mentioned from a viewpoint of ester exchange reaction speed, that for the number of alkoxyl group combined with one silicon atom of a silanol group, two or more more pieces are preferred, and its three pieces are more preferred. Therefore, a trimethoxysilane group is the most preferred.

[0277] As an example of an ingredient, (H) gamma-aminopropyl trimethoxysilane, gamma-aminopropyl methyl dimethoxysilane, gamma-aminopropyl triethoxysilane, gamma-aminopropyl ethoxy dimethoxysilane, gamma-(2-aminoethyl) aminopropyl trimethoxysilane, gamma-(2-aminoethyl) aminopropyl triethoxysilane, gamma-(2-aminoethyl) aminopropyl ethoxy dimethoxysilane, gamma-(2-aminoethyl) aminopropyl trimethoxysilane, gamma-(2-aminoethyl) aminopropyl triethoxysilane, gamma-(2-aminoethyl) aminopropyl ethoxy dimethoxysilane, gamma-ureido propyltrimethoxysilane, N-vinyl-gamma-aminopropyl trimethoxysilane, N-vinyl-gamma-aminopropyl triethoxysilane, N-vinyl-gamma-aminopropyl ethoxy dimethoxysilane, Amino group content: Silane, as NH -NH₂, bis(trimethoxysilyl)aminodiamine, bis(trimethoxysilyl)propanamine, and gamma-(2-(2-aminoethyl)aminoethyl)aminopropyl trimethoxysilane, can be mentioned. A denatured derivative and a condensation reaction of the above-mentioned silane compound can also use the above-mentioned silane compound as a (H) ingredient.

[0278] The (H) ingredient used for this invention is used in 0.1–10 mol-% to 100 mol-% of organic polymers of the (Aa) ingredient. It is preferred to use it in 1–5 mol-%. The above-mentioned (H) ingredient can be added to the polymerization system at any time during the polymerization process.

[0279] In this invention, an epoxy resin can be used as a (1) ingredient. This epoxy resin has a function which raises stability, endurance, and creep resistance further while improving impact strength and tough nature of an organic polymer which are the (A) ingredients of this invention.

[0280] As an epoxy resin used as a (1) ingredient of this invention, an epichlorohydrin bisphenol A type epoxy resin, a bisphenol A type epoxy resin, such as epichlorohydrin bisphenol F type epoxy resin and bisphenol A type epoxy resin, or tetrabromobisphenol A. Novolac type epoxy resin, a hydrogenated bisphenol A type epoxy resin, a glycidyl ether type epoxy resin of a bisphenol A propylene oxide addition, p-xylenecyclophosphazene diimide/bisphenol A epoxy resin, a methimazol series epoxy resin, *N,N*-dicyclohexyl-*N,N*-dimethylbenzylamine system epoxy resin, a urethane modified epoxy resin, *N,N*-dicyclohexyl-*N,N*-dimethylbenzylamine system epoxy resin, and *N,N*-dicyclohexyl-*N,N*-dimethylbenzylamine system epoxy resin, and an epoxy resin containing a polyisobutylene glycol, a polyisobutylene glycol, a polyisobutylene glycol ether, and glycidene. Not a thing limited to these, an epoxy resin currently generally used is used, and it gets. What contains an epoxy group in [] molecule at least has high reactivity when hardening, and a hardened material is preferred from points — it is easy to build three-dimensional meshes of a net. As a still more desirable thing, bisphenol A type epoxy resin or novolac type epoxy resin is used. Range of using rate of these epoxy resin [0] and a tetrafunctional silicon grain containing organic polymer (AA) are (AA) epoxy resin = 100 / 1 ~ 1 / 100 in a weight ratio. (A) is the improvement effect of impact at a tenth of an epoxy resin hardened material, tough nature, endurance, and creep resistance becomes difficult to be secured if a rate of polyisobutylene glycol, polyisobutylene glycol ether, and glycidene, Not a thing limited to these, an epoxy resin with uses of the hardness/hardening condition, etc., are not generally decided. But for example, when improving the shock resistance of an epoxy resin hardened material, flexibility, touch nature, peel strength, etc., it is good to carry out 5 ~ 100 weight% section use of the (AA) ingredient, still more preferably one to 100 weight section use of epoxy resin [0] weight% action. On the other hand, when improving intensity of a hardened material of the (AA) ingredient, it is good to carry out 5~50 weight% section use of the epoxy resin five to 100 weight section still more preferably especially one to 200.

weight section to (AA) ingredient 100 weight section

his is a gathering of an interesting group of university students, graduate and undergraduate, who have come together to discuss their various fields of interest.

[0278] The (H) ingredient used for this invention is used in 0.1-10 copies to [0] copies of organic polymers of the (AA) ingredient. It is preferred to use it in 1-5 copies especially. The above-mentioned (H) ingredient may be used in the form of a solid or liquid. It may be used as such or may be dissolved in a liquid solvent.

and right section to (AA) ingredient 100 weight sections

When using a hardening agent of an epoxy resin, the amount used is in the range of 0.1 to 300 weight percent of the resin. The curing conditions will depend on the type of resin and hardener used.

[Q283] Ketamine can be used as a hardening agent of an epoxy resin. In the state where ketamine does not have moisture, it exists stably, and it is decomposed into primary amine and ketone by incitement, and produced primary amine serves as a hardening agent of the room-temperature-curing nature of an epoxy resin. If ketamine is used, a liquid type constituent can be obtained. As such ketamine, it can obtain by a condensation reaction of an amine compound and a carbonyl compound.

[When an imino group visits in kainine, an imino group may be made to react to vicinal ether, which is a hydroxyl ester, such as a styrone diester, but vicinal ether and alkyl hydroxyl ester, such as ketimines may be used independently two or more times each was used and for them, 1-10 mg of each section used is carried out to apply again 100 weight, together, and the amount used changes according to the number of sections used.

[0286] Various building agents other than a minute, hollow body of the (F) ingredient may be blended with a hardenability constituent of this invention. It is not limited especially as said building agent, but for example, fume silica, sedimentation silica, and carbon black. Calcium carbonate, building agents, such as magnesite, calcium diatomite, calcination clay, clay, titanium oxide, bentonite, organic bentonite, ferric oxide, a zinc oxide, and hydrosilicate caustic oil; flour fillers, such as

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as asbestos, glass fiber, and a filament, are illustrated.

[0287] To obtain a hardenability constituent with high intensity with these building agents, Mainly Fumes Silica, sedimentation nature silica, a silicic acid anhydride, hydrous silica acid, carbon black, A desirable result will be obtained if a building agent chosen from surface treatment detailed calcium carbonate, cabinettor clay, clay, an active white, etc., is used in the range of ~100 weight section to organic polymer (A) 100 weight section. When elongation wants to obtain a hardenability constituent which is size with few strength. A desirable result will be obtained if a building agent mainly chosen from titanium oxide, calcium carbonate, magnesium carbonate, talc, ferric oxide, a zinc oxide, etc. is used in the range of 5~200 weight section to organic polymer (A) 100 weight section. Of course, these building agents may be used only by one kind, and may mix and use two or more kinds.

[0288] In a hardenability constituent of this invention, since elongation of a hardened material can be enlarged or a lot of building agents can be mixed if a plasticizer is used, using it together with a building agent, it is more effective.

[0289] As this plasticizer, diethyl phthalate, dibutyl phthalate, phthalic ester, such as acetylbenzo phthalate; Diethoxy adipic diacid ester, such as acetoxy acid to harden and obtain seahorse; Diethoxy 40% dibenzene, Glycol ester, such as pentanoyl ester; Estyl oleate; Aliphatic amines ester species, such as methyl acetyl ridolinate; Triethyl phosphate; Phosphoric ester, such as triethyl phosphate and phosphoric acid octadecyl ester; Epoxidized soybean oil; Polyether, such as polyester plasticizer; polypropylene glycol, such as polyester of epoxy plasticizer; diisocyan acid and dihydroxy alcohol, such as propylene glycol, and epoxy stearic acid benzyl, and a derivative of those; Poly alpha-methylstyrene; Polystyrene, such as polyvinyl chloride, polyisoprene, and chlorinated paraffins, can use it independently arbitrarily in a form of two or more kinds of mixtures. A desirable result will be obtained if the amount of plasticizers is used in 100 or less weight sections to organic polymer (A) 100 weight section.

[0290] A polymeric plasticizer can be used. If a polymeric plasticizer is used as compared with a case where a low molecular plasticizer which is a plasticizer which does not contain polymer component in a molecule is used, early physical properties are maintained over a long period of time, and drying property (it is also called paintwork) at the time of applying an alkoy paint to this hardened material can be improved. A vinyl-base polymer produced by polymerizing by various methods in vinyl system monomer, as an example of a polymeric plasticizer, Diethylane, Glycol dimercaptoate, Ester species of polyalkylene glycol, such as triethylene glycol dimercaptoate and Bentenhydroxylate; Sebacic acid, Dihydro acid and ethylene glycol, such as ethylene acid, sebacic acid, and phthalic acid; A diethoxy glycol, Ethylene glycol, propylene glycol, and propylene glycol, A polymeric plasticizer obtained from dihydro diethoxy glycol, such as dipropylene glycol, 300 or more molecular weights, further 1000 or more polyethylene glycols, polypropylene glycol, A hydroxy group or polyester polyol, such as a derivative polyterephthalene glycol, or the polyester polyol An ester group, polycarbonate, L such as a derivative changed into an other group etc., L — polyethylene [such as polyethylene and Poly allyl-methyl methacrylate], L¹ although polybutadiene, polybutene, polyisobutylene, butadiene acrylonitrile, polychloroprene, etc. are mentioned, it is not limited to these.

[0291] Among these polymeric plasticizers, a polymer of the (A) ingredient and a thine to arc preferred. Polymer and a vinyl-base polymer are preferred. A heat-resistant point to compatibility and wearability, and a vinyl-base polymer are especially preferred. Also, in a vinyl-base polymer, an acrylic polymer and/or an methacrylic system polymer are preferred, and acrylic polymers, such as polyacrylic acid alkyl ester, are still more preferred. Its molecular distribution is narrow, since hypoacrylate-izing is possible for a synthetic method of this polymer, it is preferred, and it is still more preferred. [L of an atom-transfer radical-polymerization method] [of a living radical-polymerization method] It is preferred to use a polymer what is called by a SGO process which obtained an acrylic-acid-alkyl-ester system monomer indicated to JP 2001-207157A by continuation

mass polymerization with an elevated temperature and high voltage.

[0292] Although number average molecular weights of a polymeric plasticizer are 500~15000 indefinitely, they are 800~10000 more preferably — further — desirable — 1000~8000 — it is 1000~5000 especially preferably. If a molecular weight is too low, a plasticizer can flow out temporarily by heat, or if a ratio, early physical properties cannot be maintained over a long period of time, and alkoy paintwork cannot be improved. If a molecular weight is too high, viscosity will become high and workability will worsen. Although molecular weight distribution in particular of a polymeric plasticizer is not limited, a narrow thing is preferred and less than 1.70 or less are preferred. 1.40 or more preferred. In addition, 1.60 or less are preferred, 1.50 or less are still more preferred. 1.40 or less are preferred, and 1.30 or less are the most preferred.

[0293] A number average molecular weight of a polymeric plasticizer and molecular weight distribution (M_w/M_n) are measured by the GPC method (polybutylene conversion).

[0294] Although a polymeric plasticizer does not have a reactive silicon group, it acts as a reaction plasticizer and shift of a plasticizer from a hardened material one be prevented. When it has a reactive silicon group, it averages per molecule or one or less piece and 0.8 more piece or less are preferred. When using a plasticizer which has a reactive silicon group, especially an ionoyleum polymer which has a reactive silicon group, the number average molecular weight needs to be lower than a polymer of the (A) ingredient.

[0295] A plasticizer may be used alone and may use two or more sorts together. A low molecular plasticizer and a polymeric plasticizer may be used together. These plasticizers can also be blended at the time of polymer manufacture.

[0296] The amount of plasticizer used is 20~100 weight section still more preferably ten to 120 weight section preferably five to 50 weight section to (A) ingredient 100 weight section. In less than five weight sections, if an effect as a plasticizer stops being revealed and 150 weight sections are exceeded, mechanical strength of a hardened material runs short.

[0297] It is a general formula in order to improve the activity of a condensation catalyst, more in a hardenable constituent of this invention. $R_3SKO(O)_{n-2}R'$ (R is substitution or an unsubstituted hydrocarbon group of the carbon numbers 1~20 independently among a formula, not carried out, as is 0, 1, 2, or 3, a silicon compound shown may be added. Although limitation is not carried out, as said silicon compound Phenylhydroxymethylhydroxymethylsilane, Phenylmethyldimethoxysilane, phenylmethoxydimethoxysilane. Since a fact that what is an acyl group of the carbon numbers 6~20 accelerates hardening, action of a co-catalyst is large. R in general formulas, such as diphenylmethoxysilane, diphenyl ethoxysilane and diphenyl methoxysilane is preferred. Especially diphenylmethoxysilane and diphenyl diethoxysilane are low cost, and especially silanes, they are easy to receive, they are preferred. If loadings of this silicon compound, about 0.01~0.10 weight, and gamma-propoxysilane, such as methyl TOKTOSI propoxysilane, gamma-butyldiethoxysilane, gamma-butyldipropoxysilane, vinylmethoxysilane, dimethylmethoxysilane, gamma-butyldipropoxysilane, trimethylsilane, and *n*-propyltrimethylsilane; Dimethylsilanol is propoxysilane. Also is propoxysilane, such as methyl TOKTOSI propoxysilane and gamma-glycidoyl distribution; JJSIS propoxysilane, gamma-butyldipropoxysilane, Vinylmethoxysilane, dimethylmethoxysilane, gamma-butyldipropoxysilane, trimethylsilane, and *n*-butyltrimethylsilane, which have functional groups, such as N-(beta-aminoethyl) aminopropyl methyl dimethoxysilane,

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Dimethylsilanol is propoxysilane. Also is propoxysilane, such as methyl TOKTOSI propoxysilane and gamma-glycidoyl distribution; JJSIS propoxysilane, gamma-butyldipropoxysilane, Vinylmethoxysilane, dimethylmethoxysilane, gamma-butyldipropoxysilane, trimethylsilane, and *n*-butyltrimethylsilane,

which have functional groups, such as N-(beta-aminoethyl) aminopropyl methyl dimethoxysilane, vinylmethoxysilane, dimethylmethoxysilane, gamma-butyldipropoxysilane, trimethylsilane, and *n*-butyltrimethylsilane, which have functional groups, such as N-(beta-aminoethyl) aminopropyl methyl dimethoxysilane,

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gamma-mercapto propyltrimethoxysilane, and gamma-mercaptopropyl dimethoxysilane; polyoxazoles are mentioned. By using solid physical-properties regulator, hardness when stiffening a constituent of this invention is raised, or hardness is lowered considerably after fracture can be taken out. The above-mentioned physical-properties regulator may be used independently, and may be used together two or more sorts.

Especially, a compound that generates a compound which has a univalent silanol group in intramolecularly by hydrolysis has the operation which reduces a modulus of a hardened material without worsening stickiness of the surface of a hardened material. A compound which generates especially a trimethyl silanol is preferred. A compound indicated to JP-H-11752, A can be raised as a compound which generates a compound which has a univalent silanol group in intramolecularly by hydrolysis. A compound which generates a silanol compound which is a derivative of allyl alcohol, such as a hexanol, octanol, and decanol, and generates R_3SiOH **, such as a trimethyl silanol, by hydrolysis. Trimethylolpropane indicated to JP-HI-1-241029A, A compound which generates a silicon compound which is a derivative of polyhydro alcohol whose numbers of hydroxyl groups, such as glycerin, pentenitol, or sorbitol, are three or more, and generates R_3SiOH **, such as a trimethyl silanol, by hydrolysis can be raised.

[0300] A compound which generates a silicon compound which is a derivative of an oxpropylene polymer which is indicated to JP-H-255534A, and generates $R_3Si(OH)_2$, such as a trimethyl silanol, by hydrolysis can also be raised. A polymer which has a silicon content group which can serve as a monolaminant content compound by a hydrolysis silicon content group and hydrolysis in which bridge construction furthermore indicated to JP-H-E-279693A, is the possible case also be used.

A physical-properties regulator is preferably used in the range of 0.5 – 10 weight section to (A) ingredient 100 weight section.

In a hardenable constituent of this invention, a lepept is prevented if needed, and in order to improve workability, a thixotropic grant agent (lepept inhibitor) may be added. Although not limited especially as a lepept inhibitor, metallic salts, such as calcium stearate, and barium stearate, is mentioned, for example. These thixotropic grant agent (lepept inhibitor) may be used independently, and may be used together two or more sorts. A thixotropic grant agent is used in the range of 0.1 – 20 weight section to (A) ingredient 100 weight section.

A compound which contains an epoxy group in one molecule is a constituent of this invention can be used. If a compound which has an epoxy group is used, the stability of a hardened material can be improved. Compound shown in epoxidation unsaturation oil and fat, epoxidation unsaturation fatty acid ester, alkylene, and an epoxidized hydrocarbon derivative as a compound which has an epoxy group, those mixtures, etc. can be used. Specifically, epoxidized soybean oil, epoxidation linseed oil, d(2-ethylhexyl) 4,5'-epoxy cyclohexane-1,2'-EPH, rate (E-P), epoxy octyl stearate, epoxy butyl stearate, etc. are raised. Especially in these, E-P is preferred. An epoxy compound is good to use it in the range of 0.5 – 50 weight section to (A) ingredient 100 weight section.

[0304] An oxygen hardenable substance can be used for a constituent of this invention. To an oxygen hardenable substance, an unsaturated compound which can react to oxygen in the air can be illustrated. It reacts to oxygen in the air. A cured film is formed near the surface of a hardened material, and an operation of preventing adhesion of stickiness of the surface, gathering on the surface of a hardened material, and due to carried out. Dryout oil represented with tung oil, linseed oil, etc. by example of an oxygen hardenable substance. Various alkyl resins produced by dehydrohalogenating this compound. An acrylic polymer which denaturalized with drying oil, Epoxy system resin, silicon resin; Butadiene, chloroprene, isoprene, Diene series, such as 1,3-pentadiene, a polymerization or 12-polybutadiene produced by making carry out copolymerization. Liquefied polymers, such as a polymer

of 1,4-polybutadiene, C5 – C8 diene, NBR produced by making carry out copolymerization of these diene series and the monomers which have copolymer, such as acrylonitrile and styrene, etc. (a maleic anhydride, a sulfonated polymer, those various desaturation things, etc.) such as SBR, are mentioned. These may be used independently and may be used together two or more sorts. Especially among these, tung oil and a liquefied diene system polymers are preferred. A constituent use of a catalyst and a metal other which promote an oxidation hardening reaction may heighten an effect. As these catalysts and metal others, metal salt, such as cobalt naphthalene, lead naphthalene, a borophenic acid zinconate, acrylic acid cobalt, and an acrylic acid zinconate, an amino compound, etc. are illustrated. It is best still more preferred to use it in the range of 0.1 – 20 weight section to (A) ingredient 100 weight section, and the amount of oxygen hardenable substance used is 0.5 – 10 weight section. An improvement of stain resistance becomes less enough when said amount used will be less than 0.1 weight sections, and 20 weight sections are surperior. A tendency for the tractive characteristics of a hardened material, etc. to be spoiled will arise. An oxygen hardenable substance is good to use it, using together with a photoresist substance as indicated to JP-H-15005A. [0305]

A photoresist substance can be used for a constituent of this invention. If a photoresist substance is used, a coat of photoresist substance on the hardened material surface, and stickiness of a hardened material and its weatherability of a hardened material can be improved. By operation of light, molecular structure causes a chemical change considerably for a short time, and a photoresist substance produces physical-properties change of hardening etc. Many things, such as a constituent containing an organic monomer, oligomer, resin, or them, are known by this kind of compound, and commercial arbitrary name can be adopted as it. As a typical thing, an unsaturation acrylic compound, polyisobutylene vinyl, or azidized resin can be used. As an unsaturation acrylic compound, acrylic or an methacrylic system unsaturation group 1 thru 9 or a monomer which it has partly, it is mixtures, such as acrylene or it, and monomers, such as propylene (for butylene, ethylene), GLYKORIKUSU (meta) dimethacrylate, or with a moleculer weight of 10,000 or less oligoesters is illustrated. For example, Special Acrylic, ARONIKUSU M-215, ARONIKUSU M-210 (2 Function), ARONIKUSU M-245, (three organic functions) ARONIKUSU M-205, ARONIKUSU M-205, ARONIKUSU M-210, ARONIKUSU M-400, etc. can be illustrated, a compound containing especially an acrylic functional group is preferred, and compound which averages in one molecule and contains the three or more functional groups is preferred. (Each ARONIKUSU is a product of Toagosei chemical industry incorporated company above.)

A polyisobutylene acid vinyl derivative of many besides is a photopolymer which uses a cinnamoyl group as a sensitization group, and esterified polyvinyl alcohol with cinnamic acid is illustrated. A zidized resin is known as a photoresist, which uses an azido group as a sensitization group, usually a "photozidized" (Show 471912) — on March 17) besides [which added a diazo compound, as a sensitizing agent] a thicker sensitizing solution [and] printing society publication part 1 issue, and the page 106th page – 117th page – have detailed illustration — these — sensitizer can be used, being able to mix and adding it. [It can be independent, or if needed. Addition of accelerators, such as sensitizers, such as ketone and a nitrile compound, and amine, may heighten an effect. A photoresist substance is good to use it in the range of 0.5 – 10 weight section preferably 0.1 to 20 weight section to (A) ingredient 100 weight section, and in 0.1 or less weight section, since there is no effect which improves weatherability, and a hardened material becomes hard too much and produces a cracking crack in 20 or more weight sections, it is not desirable.

[0306] An antioxidant (antiauging agent) can be used for a constituent of this invention. If an antioxidant is used, the weatherability of a hardened material can be improved. Although a hindered phenol system, a mono-phenol system, a bisphenol system, and a polyphenol system can be illustrated as an antioxidant, especially a hindered phenol system is preferred. Similarly, Iminu 622D, thium 144; OHIMASSORB844LD, OHIMASSORB844LD, CHIMASSORB1910 (all are the Chiba-Delley Japan, Inc. make above;

IP 4101632.B [DETAILED DESCRIPTION]

[007] Light stabilizer can be used for a constituent of this invention. If light stabilizer is used, photodegradation degradation of a hardened material can be prevented. Although a benzotriazole system, a hindered amine system, a benzene compound, etc. can be illustrated as light stabilizer, especially a hindered amine system is preferred. It is at best still more preferred to use it in the range of 0.1 - 10 weight section (A) ingredient [00] weight section (A). An example of light stabilizer used in this amount of antioxidant is indicated also to JP-H5-154731. A [008] [009] Light stabilizer can be used for a constituent of this invention. If light stabilizer is used, photodegradation degradation of a hardened material can be prevented. Although a benzotriazole system, a hindered amine system, a benzene compound, etc. can be illustrated as light stabilizer, especially a hindered amine system is preferred. It is at best still more preferred to use it in the range of 0.1 - 10 weight section (A) ingredient [00] weight section (A), and the amount of use of light stabilizer used in this amount of antioxidant is indicated also to JP-H5-154731. A [008] [009]

In view of the unsaturation of this invention, it is preferred to use a tertiary amine content hindered amine light stabilizer as a hindered amine stabilizer as indicated to JP-HI-73-131A because of preservation improvement of a comment. As a tertiary amine content hindered amine light stabilizer, ** are the Chiba-Gel Japan, Inc. make phenol novoborn-622DL and triurethane UH-144, CHIMASSORPH119H901ne. All are the ADEKA-AU chemicals incorporated company made above. MARKLA-57L, LAA-071, LAA-031 all are the Sankyo Co. Ltd. made above. SANDRI-765, LS-282, LS-2826, LS-1114, LS-744, (LAI) are the Sankyo Co. Ltd.

[0039] An ultraviolet ray absorber can be used for a constituent of this invention. If an ultraviolet ray absorber is used, the surface weatherability of a hardenable material can be improved. Although a benzophenone series, a salicylate series, a substituted tolly system, a metal chelate system compound, etc. can be used as ultraviolet ray absorbers, especially a benzophenone system is preferred. It is at best still more preferred to use in the range of 0.1 - 10 weight percent of the hardenable material.

An ingredient which limitation in particular does not have in the method of preparation of a heterogeneity constituent of this invention, for example, was described above is bledenit, it kneads under ordinary temperature or heating using a mixer, a roll, a feeder, etc., or an ingredient is dissolved using a little suitable solvents, a usual method of mixing is adopted, and it gets. A many liquid, such as 1 liquid mass and a two-component system can also be made and antoxidant, a hundred amine light stabilizer, and a peroxazone system are availed by user himsel-

usability by combining these ingredients suitably.

[0311] If a hardenability constituent of this invention is exposed into the atmosphere by operation of moisture, it will form network structure in three dimensions, and will harden it promptly to a solid which has rubber-like elasticity.

[0312] It uses using a hardenability constituent of this invention. If needed Adhesive improving agents other than an amminoline, a physical-properties regulator, it is possible to add suitably various additive such as a preservation stability improving agent, an ultraviolet ray absorber, a metal deactivator, anti-ozonant, light stabilizer, amine system radical chain inhibitor, the Lynn system

[0313] A hardening constituent of this invention can be used for sealant, such as a binder, a building, a marine vessel, and a super highway, adhesive, modeling material, a vibroisolating material, a sound deadener, a sound insulating material, a choice of form, a painting, a guming material etc. Electrical insulation materials, such as electric component materials, such as a solar cell rear-face insulating agent, pre-insulation an electro wire, material for cables, Elastio adhesive, powder coatings, provide decomposition agent, lubricant, paints, and a foaming agent.

casting material, a medical-application rubber material, a medical-application binder, A sealing material for masonary joints of stonework materials, such as a medical equipment sealant, food packing material, and a sealing board. A coating material, a primer, a conductive material for electrostatic coating over, a thermally conductive material, A charge of a hot melt material, a potting agent for electric electronics, a film, a gasket, It is available as a fluid/semisolid agent used for various uses, such as a fluid/sealant agent used in various moldings, materials and weld sheet, glass and a sealing agent for rust prevention / water proof of machine parts like die cast section, autocrops, electrical machinery parts, several kinds of metal parts, such as metal, wood, plastic, ceramic, paper, metal, and a resin/molding agent for a wide variety of large areas, such as glass, porcelain, wood, metal, and a resin/molding agent, It is suitable also as various seal constituents and adhesion constituents of a type. A hardness/durability constituent of this invention achieves in durability, endurance, and creeping resistance. Adhesives for interior panels, adhesives for exterior panels, adhesives for tiling, adhesives for stone tensions, Callig, finishing adhesives, floor finishing adhesives, adhesives for finishing of wall, adhesives for car panels, it is desirable, especially when it is considered as the electrical and electric equipment, a car panel, an adhesive and adhesives for protruding mechanical equipment, such as, sealing material for aircraft/gearbox a sealing material for multiple planes, a sealing material for speed signal generator construction methods, or a sealing

[0314] [Example] Although working example is hung up over below and this invention is explained to it in more detail, this invention is not limited only to these working example.

[0315] (Synthetic example 1) Use polypropylene triol of the molecular weight 3,000 [about] as an initiator, and propylene oxide is polymerized in a zinc hexa cyanocobaltate(II) complex compound catalyst. Number average molecular weight about 20,000. (Polyethylene reduced molecular weight in which the column measured by the solvent using THF using TOSCH H-type HLC-820GPC as a liquid-feeding system) polypropylene oxide was obtained. Then, the methanol solution of NaOMe of the equivalent was added 1.2 times to the hydroxyl group of this hydroxyl group and polypropylene oxide and methanol was added off and also the alky chloride was added, and the hydroxyl group of the alkyl chloride and polypropylene oxide was reacted to remove the unreacted allyl ether.

[0316] The obtained polypropylene oxide (10 weight section) which is not refined [which was obtained in 1,1-methane 300 weight section] after it carried out mixed stirring of the water 300 weight section further at the heating solution obtained by centrifugal separation removed water carrying out mixed stirring of the water 300 weight section and a centrifugal separation removed water again, decomposition devolatilization removed hexane. By the above, and a total of 3 organic materials polypropylene oxide of the number average molecular weight 26,000 [about] which is an

[0316] 150 mg of platinum content 3 wt% of platinum vinyl alkene comonomer emulsion are made into a catalyst to allyl end polypropylene oxide 100 defined weight solution. It was made to react to methyl dimethacrylate 14 weight section at 90 °C for 7 hours, and then to methyl dimethacrylate group and polybutadiene series polymer (A-1) was obtained. Measured by ¹H-NMR (it measures in a CDCl₃ solvent, JECN-JNM-LA4D) averaged the methyl dimethacrylate silyl group of the end per molecule, and they were 2.3 pieces.

[0317] (The reference example 1, working example 2-4, and comparative examples 1-2) The organic polymer ($\kappa-1$) (00 weight section which has the receptive silicon group obtained in the synthetic example 1 according to the combination formula shown in Table 1, Surface treatment colloid calcium carbonate (product made from Shiraiwa Industry, Hakenka GCR) 120 weight section, Titanium dioxide (Ishihara Sangyo make), TAIFQUE R-820 20 weight section, DIPSURAP 6500, the amount part of thiodioboro graft agent (made in [Kumamoto Chemicals Co., Ltd.] 6500), dianilines, and light stabilizer (the Sankei make), SANIUR L5701 weight section, an antioxidant (product absorbent (made in Thia Specialty Chemicals Company) Tinuvin 3271 weight section, and an ultraviolet ray absorber made from Ouchi Shinko Chemical industry, NOKURAKU SP) 1 weight section, The amount part of

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18/64 ページ

[03118] (Hauling physical properties of a hardened material)
It was $23 \times 3 - 450 \times 450$ mm², recuperated in the class product of Table 1 on the 4th, and the sheet about: 3 mm thick was created [per day]. It examined by having pierce this sheet to the No. 3 dumbbell type and having pulled it at 200-mm/min in hauling speed, and was extended at the time of intensity (MPa) and Eb fracture at the time of M50:50% hauling modulus (MPa) and fracture, and (%) was measured. A result is shown in Table 1.

30

(Recover) It was $23 \times 90 + 60 \text{ mm}^2$ recuperated in the cases product of Table 1 on the 4th, and the sheet about 3 mm thick was created. per day. This sheet was pierced to No. 3 dumbbell type, and where 20 mm is pulled to 40 mm between the marked lines (100% extension), it fixed at 00° for 24 hours. The recovery was measured from the rate which opened this wide at 23 mm, and the marked line restored 1 hour afterward. It means that the one where the recovery is larger is excellent in stability. A result is shown in Table 1.

(Creep measurement using the piece of a dumbbell)
 This was $22 \times 30 \times 50$ mm thick in the glass probe
 mm thick was created. [Per day.] This sheet was described. The end of
 line of 20 mm of intervals was described. The end of
 a piece of a dumbbell was hung. 0.4 time as much
 mentioned tension physical properties measurement
 lower end of the hang piece of a dumbbell. The dis-
 marked lines of 200 hours after immediately after
 where a piece of 200 hours a difference is smaller is excalate.

[0321]
[Table 1]

[0223]

As shown in the comparative example 1 of Table 1, when organic tin (U-220) is used as a curing catalyst, especially the recovery of creep resistance is low because silicate additive-free. However, as shown in the references example, 1-stability and creep resistance are notably improved by addition of silicate. As shown in the comparative example 2, when carbonoxy acid salt (neat SUTAN U-50) etc. are used, not using organic tin (U-220) as a curing catalyst, stability and creep resistance also with good silicate additive-free are shown, but, As shown in working example 2-4, stability and creep resistance further outstanding by silicates addition were shown. The chelate silicate 40 and the

[0331] When the reactive silicon group of an end uses the organic polymer (A-2-5) which is the Toril alloy, the allyl end groups from comparison with the reference example 5-9 of Table 2, and the comparative examples 3-5, 9-10, and the reference example 11 using carboxylic acid thin salt (see SULTAN U-50) as a curbing catalyst showed the further outstanding recovery.

(Synthetic example 6)
Using polyacryloyl chloride of the molecular weight 3,000 [about] as an initiator, and the hydroxy acrylate and propylene oxide of the number average molecular weight 26,000 [about] produced by polymerizing propylene oxide in the zinc β -cyanocobalt(II) complex compound catalyst is obtained in the same procedure as the synthetic example 3.

(These reference examples 1-14 and comparative example 6) The reference examples 1-14 and comparative example 6 are the reactive silicon group obtained in the organic polymeric polymer (A_1-A_6) 100 weight section which has the reactive silicon group obtained in the synthetic example 1 and the synthetic examples 4-6 according to the combination formula shown in Table 3. Surface treatment oil cold calcium carbonate (product made from Shiraishi Industry, HATOBOKU) 120 weight section, Titanium oxide (Tahbara Sanquo make, TPAQUE H-8020) 20 weight section, the amount part of crosslinker agent (made in A_1-A_6) 100 weight section, DIP55 10 weight section, the amount part of crosslinker agent (made in A_1-A_6) 100 weight section, DIP55 10 weight section, and light stabilizer (The Speciality Chemicals) Taisui LS-1000 (Nippon Chemicals), Adures, and light stabilizer (The Speciality Chemicals) Taisui LS-1000 (Nippon Chemicals) 1 weight section, antioxidant (product made from Ouchi Shikhi Chemical Industry, NORIKURAKU 327) 1 weight section, Antioxidant product made from Ouchi Shikhi Chemical Industry, NORIKURAKU 1171) 1 weight section, and a curing agent (beta-aminooxy-vinylmethoxysilane (Nippon Unicar make, A-100) 1 weight section, and a curing agent (catalytic acid) on salt (Nippon Unicore make, U-05) 1 weight section, and a curing agent (catalytic acid) on salt (Japanesee east Transformation make, neodecanoic acid (dialkyl triad name: U-05) 4 weight section, Carbonyllic acid (product made from Japan Epoxy Resin) neodecanoic acid (trade name: CARBASICK) 12 weight section, and amine (Wake Poly Chemical Industries make, lauryl amine) 0.75 weight section, 100 weight section, After kneading in the state where moisture does not exist substantially under heating conditions, it is sealed in the damp-proof container and 1 liquid mold-curing nature component was obtained.

[1335] It examined by having pulled by the same method as the above-mentioned using the class product of Table 3, and was extended at the time of M_{50} and E_{50} . A result is shown in Table 3.

[0336] The recovery was measured by the same method as the above-mentioned using the class product of Table 3. However, the stretched state was fixed at 60 ** 100% for 24 hours this time, and the recovery was measured from the rate which opened this wide at 23 *** and the marked line restored 1. *Recovery* was measured from the rate which opened this wide at 23 *** and the marked line restored.

[0337] The displacement difference of the distance between the marked lines of 200 hours after immediately

A product of Table 3, by the same method as the method of the reference example 1 and working example 2-4, was measured. A result is shown in Table 3.

BRITISH JOURNAL OF MATHEMATICAL & STATISTICAL PSYCHOLOGY

[99]

[0339] Comparison with the reference examples 12–14 of Table 3 and the comparative example 6 shows

that the organic polymer with m

[0340]

[046] The displacement difference of the distance between the marked lines of 45 hours after immediately after performing the creep measurement using the piece of a dumbbell, and imposing load using the glass product of Table 4, by the same method as the method of the reference example 1 and working example 2-4, was measured. The result is shown in Table 4.

[0347]

(Synthetic example 7) Use polypropylene glycol of the molecular weight 2.000 [about], as an initiator, and the hydroxy group and polypropylene oxide of the number average molecular weight 28.500 [about] produced by polymerizing propylene oxide in the zinc chloride cyanoborohydride complex compound catalyst is used. Methyl and polypropylene oxide was obtained in the same procedure as the synthetic example 6. To this methyl and polypropylene oxide, in the same procedure as the synthetic example 6, it was added to react to methyl dimethoxysilane and the polyoxyethylene series polymer (A-7) which has an average of 1.9 methyl dimethoxy sil groups at the end was obtained.

(Synthetic example 9)
Use polyacryloyl glycol of the molecular weight 2,000 [about] as an initiator, and the hydroxyl group and polyacryloyl oxide of the number average molecular weight 28,500 [about] produced by polymerizing propylene oxide in the zinc chloride-cyanogen bromide complex compound catalyst was used. Allyl and polyacryloyl oxide was obtained in the same procedure as the synthetic example 1. In the same procedure as the synthetic example 1, it was made to react to react to methyl methacrylate and the polyacryloyl anhydride polymer (A-5) which has an acetoxy group at the 2-position of the methacryloyl group.

[0434] (The reference examples 15-16 and comparative examples 7-8] The organic polymer (A-4, A-7-9) is weight section which has the reactive silicon group obtained in the surface treatment colloid calcium carbonate (product made from Shiraihi industry, Hakukoma CCR 120) weight section. Tannin oxide (Gahara Sanya make, TAQUE R-820) 20 weight section, DIDP50 weight section. The amount part of thiokolophtalate agent (made in [Kuromoto Chemicals]), DISIPURON 6100 duplets, and light stabilizer (Tiba Specialty Chemicals), Trivu L537701 weight section, and an ultraviolet ray absorber (product made from Ouchi Shikoku Chemical Industry, NOKURAKU 3271) weight section anticondant. The amount part of dehydrator vinyltrimethylsilane (Nippon Unicar make, A-171) duplets adhesion agent N-nbutylbenzylbenzoate)-gamma-aminopropyltriethoxysilane (the Nippon Unicar make, A-1120) weight section and the amount part of curing catalyst dibutyltin bisacetoxyacetate (Urasawa east transformation make, meso SULTAN U-220) duplets were added, after kneading in the state with moisture, and then was gradually added into the polyurethane composition was

[0344] It examined by having pulled as the same method as the above-mentioned using the class product of Table 4, and was extended at the time of intensity (MPa), and Elfracture at the time of M50:50%

Young's modulus (MPa) and $\%$ fracture, and (b) was measured. A result is shown in Table 4.

The displacement difference of the distance between the marked lines of 45 hours after immediately 24 hours afterward. A result is shown in Table 4.

[Table 4]

[0248]

Comparison with the references examples 15-16 of Table 4 and the comparative examples 7-8 shows that the organic polymer ($\text{A}-\text{C}$) which introduced the reactive silicon group to the metallo group and organometallic molecules to $\text{A}-\text{C}$ exhibited and maintained

(Synthetic example 10) [343] To the allyl end polyisoprene oxide obtained in the synthetic example 1, in the same procedure as described in the synthetic example 1, it was made to react to triethyltinane and the polyisoprene series

polymer (X) to which was added an average of 1.2 mol/L urethane acyl chloride was obtained.

[053] The recovery was measured using the class product of the same method as the above-mentioned.

Table 5

組成 (重量部)		反応性モノマー		参考例		比較例	
(A4) 成分	(A4) 成分	A-10	110	基の構造	参考例	比較例	参考例
有機重合体	(A4) 成分	A-1	100	基の構造	100	100	100
充填材	Winnofit SPM	120	120	基の構造	120	120	120
可塑剤	RFK-2	20	20	基の構造	20	20	20
光安定剤	4T-MLS-770	1	1	基の構造	1	1	1
紫外線遮断剤	4T-MLS-2327	1	1	基の構造	1	1	1
酸化防止剤	175-745SP	1	1	基の構造	1	1	1
脱水剤	A-171	2	2	基の構造	2	2	2
接着性付与剤 (G) 成分	A-1100	3	3	基の構造	2	2	2
硬化促進剤	A-1120	110	110	基の構造	3	3	3
復元率	87	85	85	(%)	2	2	2
力 (J-1) (せん断)	○	○	○	(min)	20	15	15
引張強度	×	○	○	(min)	20	15	15

[0355]

If the aminosilane which has a triethoxy silyl group which is the (G) ingredient as an adhesive grant
https://www4.ipdl.inpt.go.jp/cg-bin/tran.web.cgi?ejje?atw_u=https%3A%2F%2Fwww4.ipdl..

grant

http://www4.ipdl.inpt.go.jp/cg-bin/tran.web.cgi?ejje?atw_u=https%3A%2F%2Fwww4.ipdl..

2010/04/30

組成（重量部）	反応性官能基	参考例別	比較例	有機重合体 (A4) 成分 A-2 リチウムジメチル	100	100	可塑剤 DIP	30	30	吸水剤 イソブチリニルイソブチリ	1128	2	2	接着性付与剤 (H) 成分 A-1120 リチウムジメチル	KBE-603 リチウムジメチル	3	3	硬化触媒 エタジカルU-220	2	2	50°C×7日の養生	有無	有無	皮張時間 (min)	12	13	13
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[0366] As shown in the reference example 18 of Table 6, the polymer which has a triethoxy silyl group is used for the end of the (A4) ingredient as a synergistic agent which has a methoxy silyl group which is the (H) ingredient as an adhesive grant agent, if the amine and an ester exchange reaction is promoted by care of heat, the hardenability of an organic polymer can be raised notably.

[0367] (The reference examples 19-20 and comparative example 13)

Organic polymer (A-10), 100 weight section which has the reactive silicon group obtained in the synthetic example 10, Surface treatment, cold calcium carbonate (product made from Shiraihi industry, Habanuki CCB-120 weight section, Takanoyu oxide, Ichihara Sago scale, TPAQUE-R-820) 20 weight section, DIDPES, weight sections of aromatic part of thioxocope, grant agent (made in Kusumoto Chemicals J., DISUPARON 6500) 200 weight section, and light stabilizer (the Sanryo make), SANORU LS701 10 weight section and an ultraviolet ray absorbent (made in Toki Specialty Chemicals), TRAVU 3271 1 weight section, antioxidant (product made from Ouchi Shinko Chemical Industry, NOKURAKU SP-1 1 weight section, — the amount part of dehydrator Vinyldimethylsiloxane (Nippon Unicar make, A-171) dienes, adhesion grant agent η -beta-(aminooxy)-gamma-anhydro gamma-trimethylolane (the Nippon Unicar make), A-1120) Three weight sections and the various below-mentioned curing catalysts were added, after kneading, in the state where moisture does not exist substantially under drying conditions, it reacted in the clump-drying furnace, and 1 liquid mold-curing nature constituent was obtained, the no cleaning acid (the product made from Japanese epoxy resin) which is a non-catalyst of the (E) ingredient as a curing catalyst, what carried out concordant use addition of BASA 106 weight section and the amine (Wako Pure Chemical Industries make, lauryl amine) 0.15 weight section — the difference example 19 and isopropyl titanate (titanium bis(ethylacetoate) (the Matsunomo Trading make), What carried out Olga Chike, T-750 8.5 weight-section addition was made into the reference example 20. What carried out the amount part addition of dibutyltin bisacetylacetone (Japanene east transformation make, reo SUTAN U-220) duplexes was made into the comparative example 13.

[0368] As a result of measuring the recovery by the same method as the above-mentioned using these class products, the hardened material of the reference example 19 and the reference example 20 showed the recovery higher than the hardened material of the comparative example 13.

[0369] (The reference example 19)

[0370] (The reference example 20)

[0371] (Synthetic example 11)

Use polyisobutylene glycol of the molecular weight 2,000 [about] as an initiator, and the hydroxyl group end polyisobutylene oxide of the number average molecular weight 25,500 [about] produced by polymerizing propylene oxide in the zinc hole cyanocobalamin/glyme complex catalyst is used. Allyl and polypropylene oxide was obtained in the same procedure as the synthetic example 1. To this allyl and polypropylene oxide, in the same procedure as the synthetic example 1, it was made to react to triethoxysilane and the polyalkylene series polymer (η -11) which has an average of 1.6 triethoxy silyl groups at the end was obtained.

[0372] (Synthetic example 12)

To the allyl and polypropylene oxide obtained in the synthetic example 11, in the same procedure as the synthetic example 1, it was made to react to methyl dimethoxysilyl and the polyalkylene series polymer (A-12) which has an average of 1.5 methyl dimethoxysilyl groups at the end was obtained.

[0373] (The reference example 21 and the comparative examples 14-15)

Organic polymer (A-11, A-12) 95 weight section which has the reactive silicon group obtained in the synthetic example 11 and the synthetic example 12, Surface treatment, cold calcium carbonate (product made from Shiraihi industry, Hienkuon CCR) 60 weight section, Surface treatment, cold calcium carbonate (product made from Shiraihi industry, HSUKO light R) 60 weight section, Heavy calcium carbonate (product made from Shiraihi industry, HOWATON SE) 20 weight section, DOP40 weight section, epoxy system plasticizer (New Japan Chemicals make, SANSON star EP-S) 20 weight section, thixotropic grant agent (made in [Kusumoto Chemicals J., DISUPARON 306] 3 weight section,

and a photo-setting resin (the Toagosei make.) ARONIKUSU M-303 weight section, light stabilizer (Sankyo make, SANORIUSL770) 1 weight section, Ultraviolet ray absorbent (made in [Tiba Specialty Chemicals] I. Thuvn 327) 1 weight section, Zero copy of minute hollow body (the product made from the Fuji SHIRISHA chemical, the FUJIBA Lure H-40) which is an antioxidant (made in [Tiba Specialty Chemicals] I. IRUGA NOX 1010) 1 weight section and the (F) ingredient, or 20 copies were measured, respectively, and it often kreaded with a 3 point roll, and was considered as base resin. When added 20 copies of minute hollow bodies was made into the comparative example 14, using (A-17) as an organic polymer. What added zero copy of minute hollow bodies was made into the comparative example 14, using (A-17) as an organic polymer.

[0364] Using the mixture of 2-ethylhexanoic acid tin (paraisoarate east transformation make, U-28) (divalent) 3 weight section and amine (Wako Pure Chemical Industries make, lauryl amine) 0.75 weight section as a hardening agent, above mentioned base resin and hardening agent were mixed uniformly, and workability (******) and endurance were evaluated.

[0365] The constituent of the reference example 21 had workability better than the comparative example 14, and its endurance was better than the comparative example 15.

[0366] The reference example 22 and the comparative example 16.

[0367] The reference example 10 or the synthetic example 10, surface treatment colloid calcium carbonate (product made from Shiraishi industry, HAKUNI CCR 80 weight section, Heavy-calcium-carbonate carbone (product made from Shiraishi industry, HISUIKU light SB) 60 weight section, DOP-40 weight section, epoxy section, epoxy system plasticizer (New Japan Chemical make, SANOS Sizer EP-S) 20 weight section, thixotropic agent (made in [Kusumoto Chemicals] DISPARUKU M-303) 3 weight section, and a photo-setting resin (the Toagosei make.) ARONIKUSU M-303 weight section, Ultraviolet ray absorbent (made in [Tiba Specialty Chemicals] I. Sankyo make, SANORIUSL770) 1 weight section, Ultraviolet ray absorbent (made in [Tiba Specialty Chemicals] I. IRUGA NOX 1010) 1 weight section were measured, respectively, and it often kreaded with a 3 point roll, and was considered as base resin. What added 20 copies of (A-10) as an organic polymer was made into the comparative example 16, as a hardening agent, to this base resin, the mixture of 2-ethylhexanoic acid tin (paraisoarate east transformation make, U-28) (divalent) 3 weight section and amine (Wako Pure Chemical Industries make, lauryl amine) 0.75 weight section was added, and the recovery was measured to it.

[0368] The constituents of the reference example 22 showed the recovery higher than the comparative example 16, stopping weight % of an organic polymer low.

[0369] The reference example 23 and the comparative example 17.

[0370] Organic polymer (A-10) 95 weight section which has the reactive silicon group obtained in the synthetic example 10, Surface treatment colloid calcium carbonate (product made from Shiraishi industry, Hakuendo CCR) 60 weight section, Surface treatment colloid calcium carbonate (product made from Shiraishi industry, HISUIKU light SB) 60 weight section, Heavy-calcium-carbonate (product made from Shiraishi industry, HISUIKU light SB) 60 weight section, DOP-40 weight section, epoxy system plasticizer (New Japan Chemical make, SANOS Sizer EP-S) 20 weight section, thixotropic agent (made in [Kusumoto Chemicals] DISPARUKU M-303) 3 weight section, and a photo-setting resin (the Toagosei make.) ARONIKUSU M-303 weight section, Ultraviolet ray absorbent (made in [Tiba Specialty Chemicals] I. Sankyo make, SANORIUSL770) 1 weight section, Ultraviolet ray absorbent (made in [Tiba Specialty Chemicals] I. IRUGA NOX 1010) 1 weight section and antioxidant (made in [Tiba Specialty Chemicals] I. IRUGA NOX 1010) 1 weight section were measured, respectively, and it often kreaded with a 3 point roll, and was considered as base resin. What added 20 copies of epoxy resin (the product made from Japanese epoxy resin, Epocast 828), or five copies were measured, respectively, and it often kreaded with a 3 point roll, and

was considered as base resin. What added five copies of epoxy resins was made into the reference example 23. What added zero copy of epoxy resin was made into the comparative example 17. As a hardening agent, to this base resin, the mixture of 2-ethylhexanoic acid tin (paraisoarate east transformation make, U-28) (divalent) 3 weight section and amine (Wako Pure Chemical Industries make, lauryl amine) 0.75 weight section was added, and the recovery was measured to it. The constituent of the reference example 23 showed the recovery higher than the comparative example 17.

[0370] (The reference example 24 and the comparative example 18.)

[0371] Organic polymer (A-10) 95 weight section which has the reactive silicon group obtained in the synthetic example 10, Surface treatment colloid calcium carbonate (product made from Shiraishi industry, Hakuendo CCR) 60 weight section, Surface treatment colloid calcium carbonate (product made from Shiraishi industry, HISUIKU light SB) 60 weight section, Heavy-calcium-carbonate (product made from Shiraishi industry, HISUIKU light SB) 60 weight section, DOP-40 weight section, epoxy system plasticizer (New Japan Chemical make, SANOS Sizer EP-S) 20 weight section, thixotropic agent (made in [Kusumoto Chemicals] DISPARUKU M-303) 3 weight section, Ultraviolet ray absorbent (made in [Tiba Specialty Chemicals] I. Sankyo make, SANORIUSL770) 1 weight section, light stabilizer (made in [Tiba Specialty Chemicals] I. IRUGA NOX 1010) 1 weight section and antioxidant (made in [Tiba Specialty Chemicals] I. IRUGA NOX 1010) 1 weight section were measured, respectively, and it often kreaded with a 3 point roll, and was considered as base resin.

[0372] (The reference example 25 and the comparative example 19.)

[0373] The reference example 24 showed good thin layer hardenability rather than the comparative example 18, while the high recovery was shown.

[0374] To the allyl end polyisobutylene obtained according to the example of manufacture of JP-H11-206869A, under existence of Pt catalyst, it was made to react to triethoxysilane and the polyisobutylene (A-13) which has a triethoxy silyl group at the end was obtained.

[0375] (Synthetic example 4)

[0376] To the allyl end polyisobutylene obtained in the synthetic example 13, under existence of Pt catalyst, it was made to react to methyl dimethoxysilane and the polyisobutylene (A-14) which has a methyl dimethoxy silyl group at the end was obtained.

[0377] (Synthetic example 5)

[0378] To the organic polymer (A-13) which has the reactive silicon group obtained in the synthetic example 13 and the synthetic example 14, the amount part of dibutyltin bisacetoacetate (Japanes east transformation make, neo SUFT UN-220) duplex was added, and the hardened material was obtained. The thing using (A-13) as an organic polymer was made into the reference example 25, and the thing using (A-14) was made into the comparative example 18. The hardened materials of the reference example 25 showed the recovery higher than the comparative example 19.

[0379] (Synthetic example 15)

CuBr (4.2g) and acetonitrile (72.3g) were added to the reaction vessel with an agitator, and it stirred for 15 minutes at 65 °C under a nitrogen atmosphere. Acrylic acid n-butyl (100g), 2, 5-dibromo diethyl adipate (8.8g), and acetonitrile (18.6g) were added to this, and stirring mixing was improved. Phenylmethoxy diethylenetriamine (0.17g) was added to the polymerization was made to start. Acrylic acid n-butyl (400g) was dropped continuously, heating and stirring at 70 °C. Dividing addition of the triamine (0.68g) was carried out in the middle of dropping of acrylic acid n-butyl.

[0377] When monomer conversion reaches to 95%, after devolatilizing a # monomer and acetonitrile at 80 °C, 1,7-tetrabutyl (35.7g), acetonitrile (152g), and phenyl (1.69g) were added, it heated and stirred at 70 °C successively, and the mixture containing the polymer which has an alkenyl group was obtained.

[0378] Heating & devolatilization of acetonitrile in a mixture and the unreacted 1,7-octadien was carried out. Heating with the methylcyclohexane, the iridium polymerization catalyst was made to sediment with a centrifuge and was removed. Six copies (three copies of KYO word 700SL []) product [] (Both made from Harmony Chemicals) of cobentonite was added to the methylcyclohexane solution of the polymer to 100 copies of polymers, and it heated and stirred under oxygen and nitrogen mixed gas atmosphere. Insoluble matter was removed and the polymer polymer [P1] which has an alkenyl group by condensating a polymer solution was obtained.

[0379] After having carried out heating & devolatilization (10 or less torr of decompression degree), diluting 100 copies of the polymer with 400 copies of methylcyclohexane further and removing solid content, stirring the obtained polymer [P1] at 180 °C for 12 hours, the solution was condensed and the polymer [P2] was obtained. The number average molecular weight of this polymer [P2] was 24800, and molecular weight distribution was 1.36. The number of the alkenyl groups introduced per one molecule of polymers was 1.8.

[0380] To this polymer [P2], methyl orthoformate (it is 1 mol equivalent to an alkenyl group), A platinum catalyst (1.1 mg to 1 kg of polymer as an amount of platinum metal), [-2-(trimethylsilyl) ethyl]amino-1, 1 and 3-trimethylidiloxane (they are 1.5 mol equivalents to an alkenyl group) were added in order, and it mixed, and heated and stirred at (00 °C) under a nitrogen atmosphere for 0.5 hour. It checked that the alkenyl group had disappeared by a reaction by ¹H-NMR, and the trimethoxysilyl group content polymer [A-15] which condenses a reaction mixture and is made into the purpose was obtained. The number average molecular weight was 27900 and molecular weight distribution was 1.32. The number of the silyl groups introduced per one molecule of polymers was 1.7.

[0381]

(Synthetic example 16) As opposed to the polymer [P2] obtained in the synthetic example 15, The trimethoxysilyl group content polymer [A-16] was obtained like the synthetic example 15 except having used triethoxysilyl (they are 3 mol equivalents to an alkenyl group) instead of 1,2-trimethoxysilyl.

[0382] (Synthetic example 17) As opposed to the polymer [P2] obtained in the synthetic example 15, it is methyl dimethoxysilyl (to an alkenyl group) instead of 1,2-trimethoxysilyl (they are 3 mol equivalents to an alkenyl group) used in the synthetic example 15 except having used trimethoxysilyl (they are 3 mol equivalents to an alkenyl group) instead of 1,2-trimethoxysilyl.

[0383] (The reference examples 26~28 and comparative example 20) As opposed to organic polymer 100 weight section which has a reactive silicon group — surface treatment cold oil calcium carbamate (the product made from the Shiraishi Industry) Hakkenka

CCR 50 weight section and heavy calcium carbonate (the Maru Calcium make) 25ANANOKKUSU 50 weight section, titanium oxide (Ishihara Sangyo make, TIP-AQUE R-B20) 10 weight section, DiOP-60 weight section, the amount part of thixotropic agent made in [Kiauonco Chemicals] 1, DISUPROL 6500 duplex, light stabilizer (Sankei make, SANORF SL765) 1 weight section and an ultraviolet ray absorber (made in Tai Specialty Chemicals) Irinuv 2131 weight section and dehydrator vinylmethoxysilyl (the Nippon Unicore make, A-171) the amount part of duplexes, and adhesion grant agent, N-beta-(aminoethyl)-gamma-aminopropyl trimethoxysilyl (the Nippon Unicore make, A-1120) Diabofin bisacetoxybenzene ester, transformation make, i.e., SUJAN U-220, 0.2 weight section was added as the amount part of duplexes, and a curing catalyst, i.e., after kneading in the state where a molecular chain does not exist substantially any free driving conditions it sealed in the damping container and a liquid molding nature constituent was obtained.

[0384] The #*** thing for the damping system polymer (A-15) which has the trimethoxysilyl group obtained in the reference example 26 to the acrylic ester polymer 15 which has a reactive silicon group, (A-15) Make the #*** thing for a total of 100 weight sections into the reference example 27 for the mixture of 50 weight sections and a polyalkylene series polymer 4. The #*** thing for 100 weight sections which has the methyl dimethoxysilyl group obtained in the synthetic example system polymer (A-16) which has the trimethoxysilyl group obtained in the synthetic example 16, The #*** thing for 100 weight sections was made into the comparative example 20 for the acrylic ester system polymer (A-17) which has the methyl dimethoxysilyl group obtained in the synthetic example 17. The hardened material of the reference examples 26~28 showed the recovery higher than the comparative example 20.

[Effect of the invention]

The hardness constituent of this invention is excellent in stability, endurance, and creep resistance.

[Translation done.]